The Influence of Professional Learning Communities in Elementary Schools as Measured by Student Achievement on the Georgia Criterion-Referenced Competency Tests

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Rebecca F. Ratts

Ed.S., Valdosta State University, 2001
M.Ed., Valdosta State University, 1999
B.S.Ed., Valdosta State College, 1989

This dissertation, "The Influence of Professional Learning Communities in Elementary Schools as Measured by Student Achievement," by Rebecca F. Ratts, is approved by:

Dissertation Committee Chair

James L. Pate, Ph.D.
Professor of Educational Leadership

Committee Member

Shirley P. Andrews, Ed.D.
Professor of Early Childhood and Special Education

James G. Archibald, Ph.D.
Assistant Professor of Educational Leadership

Chester C. Ballard, Ph.D.
Professor of Sociology

Interim Dean of the College of Education

Lynn C. Minor, Ed.D.
Professor of Early Childhood and Special Education

Interim Dean of the Graduate School

James T. LaPlant, Ph.D.
Professor of Political Science

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ABSTRACT

The Professional Learning Community (PLC) process has been cited by researchers and professional organizations as having potential to impact student achievement in a positive manner. As the current era of high-stakes accountability has left teachers struggling to improve the quality of teaching and learning, PLCs have been recommended to foster collaboration and make teacher practices public. Therefore, the purpose of this study was to examine elementary teachers' descriptions of their PLCs to determine if practice of the principles had an effect on student academic performance.

A quantitative research design was implemented to explore the extent to which teacher training in PLC principles, the actual practice of PLC principles, and student achievement were related. A survey was utilized to collect data regarding 194 teachers' perceptions of the existence of four dimensions of PLCs within their schools, 4 years of CRCT data was examined to measure student achievement, and descriptive and inferential statistics were used to look for possible relationships between the factors.

Statistical examination indicated PLC members who observed peers, provided feedback on instructional practices, worked with colleagues to judge student work quality, and collaboratively reviewed student work to improve instructional analysis were more likely to improve their quality of teaching. Further results indicated positive correlations between teacher level of education and observing peers, and between level of education and providing feedback on instructional practices. Positive correlations were also identified between student achievement on standardized assessments and teacher practice of collaboratively reviewing student work, working with colleagues to judge the quality of student work, and discussing student-centered educational issues.

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DEDICATION

First and foremost, to the glory of God, the author of my hope and my salvation.

To my husband, Doug, my best friend and my source of encouragement –
I never could have taken this step without you holding my hand!

Chapter I

INTRODUCTION

Recent reform movements in American schools have met with disappointing results. On August 26, 1981, Secretary of Education T. H. Bell created the National Commission on Excellence in Education to study the quality of education in America (National Commission on Excellence in Education [NCEE], 1983). In April 1983, the Commission's findings were communicated to the nation and to the Secretary of Education in a report titled *A Nation at Risk: The Imperative for Educational Reform*.

In short, the Commission stated that American society and its educational institutions seemed "to have lost sight of the basic purposes of schooling, and the high expectations and disciplined effort needed to attain them" (NCEE, 1983, p. 1). The resulting goal set by the Commission was to develop the talents of all students to their fullest potential. To reach that goal, the members stated that students would be expected to work to their highest capabilities, schools would be expected to set genuinely high standards instead of minimum ones, and parents would be expected to support and encourage their children to develop their talents and abilities (NCEE, 1983).

In 1988, 5 years after *A Nation at Risk* was published, President Ronald Reagan held a ceremony to celebrate the Excellence Movement reform initiatives started as a result of the report. Unfortunately, the United States Department of Education (USDOE) ultimately realized that, despite all the talk of reform and the investment of billions of dollars, American students were still performing at relatively low levels (DuFour &

Eaker, 1998). DuFour and Eaker (1998) argued that the lack of progress was due in large part to the fact that schools were simply encouraged to intensify their existing practices, and no new ideas were offered.

In response to the failure of the Excellence Movement, President George Bush convened a summit of the nation's governors in 1989 for the purpose of identifying national education goals to be met by the year 2000 (DuFour & Eaker, 1998). The resulting document, titled "Goals 2000: Educate America Act," included goals concerning school readiness for preschool children, school completion and graduation rates, student achievement and citizenship, teacher education and professional development, mathematics and science achievement, adult literacy and lifelong learning, parental involvement and participation, and safe, disciplined, alcohol- and drug-free schools (USDOE, 1994).

Two years after the summit, the National Center on Education and the Economy partnered with the Learning Research and Development Center at the University of Pittsburgh to create a national exam system (DuFour & Eaker, 1998). In 1994, Congress also established the National Education Standards and Improvement Council to review and endorse state and national education standards (DuFour & Eaker, 1998). While some criticized these moves as a federal takeover of the schools, a parallel Restructuring Movement with emphasis on site-based reform initiatives emerged (DuFour & Eaker, 1998). According to Newmann and Wehlage (1995), restructuring had no specific definition but included a comprehensive school redesign to incorporate strategies such as shared decision-making, flexible scheduling, teacher teaming, common curriculum,

reduction of tracking and ability grouping, standards for school accountability, and new forms of assessment, such as portfolios.

Many policy makers believed educators would embrace the Restructuring Movement because it would provide them with greater autonomy in their classrooms and more control over local decisions (DuFour & Eaker, 1998). However, Newmann and Wehlage (1995) found that restructuring strategies did not advance student learning in all schools. The researchers discovered that teachers, parents, and students were often "seriously occupied with other tasks and goals for schooling" (p. 28). For example, some teachers and administrators spent much time and energy maintaining a safe and orderly environment or completing managerial tasks.

Regrettably, the Restructuring Movement, like the Excellence Movement, failed to improve student achievement significantly in our nation's schools (DuFour & Eaker, 1998). As educators and the public became increasingly disillusioned with the state of education in America, President George W. Bush signed the No Child Left Behind (NCLB) Act of 2001 into law on January 8, 2002 (Education Week, 2004). This law expanded the federal role in education with hopes of improving the outcomes for disadvantaged students and increased the accountability of states and schools.

NCLB mandated aligning annual testing with state academic standards, bringing all students to a target level of proficiency, reporting student achievement data for schools, and requiring teachers to be highly qualified in their subject areas (Education Week, 2004). When discussing the highly qualified requisite for all teachers, many superintendents and principals argued that simply meeting state certification requirements did not ensure that educators had the practical teaching skills to help academically

struggling students (Farkas, 2003). Farkas (2003) reported that focus groups of school administrators believed teachers needed someone to coach, mentor, and develop them. The administrators suggested that expanding opportunities for professional development was one of the best ways to improve educator quality.

DuFour and Eaker (1998) believed the answer to this outcry for teacher development lay within the design of professional learning communities (PLCs). The authors stated, "The most promising strategy for sustained, substantive school improvement is developing the ability of school personnel to function as professional learning communities" (DuFour & Eaker, 1998, p. xi). R. P. DuFour, R. B. DuFour, Eaker, and Many (2006) defined a PLC as a group of educators working collaboratively in an ongoing process of collective inquiry and action research to achieve better results for their students. PLCs operate under the belief that the key to improved student learning is continuous job-embedded learning for educators. In fact, according to Learning Forward's (2011) Standards for Professional Learning, when an educator's professional development is shared with and supported by others, a culture of continuous improvement, collective responsibility, and high expectations for all students grows at a faster pace.

As PLCs engage in a culture of continuous improvement, the participants use data to identify needs and goals for student and teacher learning, extend teachers' knowledge of content and pedagogy, select and implement evidence-based strategies for identified learning goals with on-site support, and use evidence to monitor, refine, and evaluate implementation of the strategies (Learning Forward, 2011). Collective responsibility in PLCs brings together everyone within the school and the community at large to increase

teacher effectiveness in every classroom through collaboration, communication, and relationships to support student learning (Learning Forward, 2011). Finally, high expectations within PLCs enable educators to bridge the knowing-doing gap and implement deep change for individual students, teachers, and systems (Learning Forward, 2011).

To investigate the effectiveness of PLCs, Vescio, Ross, and Adams (2008) reviewed 10 empirical studies of teacher collaboration in learning communities within the United States and one large multi-site research report published in England. All of the studies reported data documenting the impact of PLCs on teaching practice and/or student learning. They found that PLC participants' practices became more student-centered over time as a fundamental shift occurred in the habits of mind the teachers brought to their work within their classrooms (Vescio et al., 2008).

Vescio et al. (2008) found that eight of the 11 studies examined the connection between PLC participation and student achievement. The studies documented improvement in student learning, as well as increases in achievement scores. The researchers concluded that student achievement increased the most where PLCs were strongest and teachers focused persistently on student learning and achievement.

Similarly, Jackl and Lougée (2012) reported that more than 80% of teachers in North Carolina's Wake County Public School System agreed or strongly agreed that their work in PLCs positively impacted their teaching performance and student achievement. The researchers found that schools with successful PLCs had lower percentages of failing grades and fewer students retained. Statistical analyses of the relationship between high-

performing PLC indices and summative assessment data documented improvement in student performance over time (Jackl & Lougée, 2012).

Statement of the Problem

The PLC process has been cited by researchers and professional organizations as having great potential to impact student achievement positively (DuFour & Eaker, 1998; DuFour & Marzano, 2011; Farkas, 2003; Jackl & Lougée, 2012). Given the growing recognition of the PLC process, the term has become commonplace in education circles, while best practices associated with PLCs often have not (DuFour & Marzano, 2011; Hord, 2008). As a result, many educators who consider themselves part of fully-functioning PLCs are not implementing any of the PLC practices recommended by experts in the field (Annenberg Institute for School Reform [AISR], 2004; DuFour & Marzano, 2011; Hord, 2008).

According to Wood (2007), as the current era of high-stakes accountability has left many teachers struggling to improve the quality of teaching and learning for all students, learning communities are often recommended to foster collaboration and to make teacher practices public. However, the researcher warned that the professional development required to foster strong PLCs "depends on teachers taking more control over their work, releasing tacit knowledge and expertise, developing critical judgment, and taking fuller responsibility for student learning" (p. 1). She also pointed out that these changes in teachers' roles and responsibilities sometimes conflicted with norms deeply entrenched within the school culture.

In an effort to add to the growing body of research surrounding the value and effectiveness of PLC practices, this study sought to discover how teachers in a Georgia

Regional Educational Service Agency (RESA) District's Focus, Highest Progress, and Highest Performing public elementary schools described their schools as PLCs in relation to a focus on learning, shared vision, collaborative culture, and supportive structural conditions. These schools were identified as high- or low-performing by the Georgia Department of Education (GaDOE) based on Criterion-Referenced Competency Tests (CRCT) data from 2009 to 2013.

The PLC dimensions, as identified by Passi (2010) in an earlier study conducted at the high school level, were used to perform a similar study at the elementary level. The study also compared teachers' training in PLC principles to their actual practice of these principles. In other words, teachers were asked if their learning communities followed through with the training they had received. Finally, reading and mathematics CRCT assessment data were examined to determine if student academic performance improved significantly with the practice of the identified PLC dimensions.

Conceptual Framework

Hord (2008) reported that in the early days of collaboration, teachers primarily carried out managerial tasks such as ordering textbooks and supplies, scheduled field trips and special events, and occasionally shared a classroom activity or conference report. In these gatherings, colleagues were able to organize their plans and activities. As team teaching and collaborating on instructional strategies and programs grew from teachers' meetings, school districts began to see the value in teacher collaboration (Hord, 2008). Because some teacher learning took place in this type of collaboration, many educators thought of working collaboratively and focusing predominately on these types of activities as the main focus of PLCs (Hord, 2008). However, with the introduction of

student learning standards, teachers and administrators discovered a need to become more intentional in their study of strategies to enable learners to reach increased levels of expectations (Hord, 2008). As a result, communities of professional educators began to develop for the purpose of improving learning. These early PLCs examined assessment data from multiple sources to pinpoint areas of strength and weakness in student learning. From these findings, educators began the work of determining what they must learn in order to become more effective teachers for their students (Hord, 2008).

Researchers with the AISR (2004) described PLCs as "groups of educators, administrators, community members, and other stakeholders who collectively examine and improve their own professional practice" (p. 2). These small groups met regularly over a period of time; focused on data, standards, instruction, equity, and results; expanded participants' knowledge; and encouraged innovation and excellence. PLCs required educators to be open and honest with themselves and with group members as they continually sought ways of improving their work. Striving for continual growth, PLC participants desired to change the culture of their schools by encouraging the evolution of teaching and learning (AISR, 2004).

The work of AISR (2004) also identified several barriers to effective PLCs. For example, some groups focused too strongly on processes, protocols, and norms rather than the important work of content and instructional practices. In other groups, while members shared and examined student and teacher work, they were reluctant to scrutinize the work deeply enough to result in changes to the design and delivery of classroom instruction. This reluctance could have stemmed from the fact that trust and equity issues were often not addressed among group members (AISR, 2004).

Other obstacles noted by AISR (2004) included a lack of development of leadership capacity and failure to document changes and results. While instructional coaches became catalysts for collaboration in PLCs, building- and system-level leaders often did not understand how they, too, could support the important work of learning communities. Additionally, AISR (2004) pointed out that many groups failed to collect documentation to support their belief that improvements in instruction and student achievement were truly the result of their work in PLCs.

Finally, while school systems provided supportive structures such as time, space, and autonomy for their PLC members to meet, they often failed to understand that these conditions alone could not ensure changes in classroom practices (AISR, 2004). For example, PLC participants often felt overwhelmed by the pressures of such large scale change in the face of so much emphasis on high-stakes testing and public scrutiny (Wood, 2007). Teachers knew they were expected to change their classroom practices, but they often felt there was not enough time to go deeper into the work of PLCs when they had to prepare their students for standardized tests (Wood, 2007).

In spite of these potential stumbling blocks, DuFour (2004) asserted that the primary mission of the PLC model was to ensure that students learned. He further stated that the PLC movement could avoid the fateful demise experienced by previous school reform efforts if educators remained faithful to the core principles of PLCs until the model became embedded in the school culture.

Purpose of the Study

The purpose of this study was to investigate whether teachers in a Georgia RESA District's Focus, Highest Progress, and Highest Performing public elementary schools

differed in the implementation of four dimensions of a PLC, how their education levels compared to their practice of PLC principles, and if their students' academic performance was impacted by their practice of the PLC dimensions.

Focus, Highest Progress, and Highest Performing elementary schools were identified as high- or low-performing by the GaDOE based on CRCT data from 2009 to 2013. The population of this study was five identified elementary schools within a Georgia RESA District. These identified Focus, Highest Progress, and Highest Performing schools were selected in an effort to include schools with students performing at various levels of achievement on standardized assessments. Schools within the RESA District were selected so face-to-face meetings could be scheduled with each school's faculty to ask teachers to participate in the surveys.

Research Questions

Research Question 1. Does the implementation of PLC dimensions differ among Focus, Highest Progress, and Highest Performing elementary schools?

Research Question 2. Does a significant relationship exist between teacher level of education and practice of PLC dimensions?

Research Question 3. Does a significant relationship exist between teacher practice of PLC dimensions and student performance on the Georgia CRCT?

Definition of Terms

The following terms used throughout this study are defined here.

Focus Schools. Georgia Title I schools with the largest within-school gaps between the highest-achieving subgroups and the lowest-achieving subgroups (GaDOE, 2012).

Highest Progress Schools. The 10% of Georgia Title I schools with the highest progress in performance for the "All Students" group ($n \geq 30$) over 3 years (GaDOE, 2012).

Highest Performing Schools. The 5% of Georgia Title I schools with the highest performance for the "All Students" group ($n \geq 30$) over 3 years. Additionally, Highest Performing Schools must have made Adequate Yearly Progress in 2011 (GaDOE, 2012).

Professional Learning Community (PLC). A group of educators working collaboratively in an ongoing process of collective inquiry and action research to achieve better results for their students. PLCs operate under the belief that the key to improved student learning is continuous job-embedded learning for educators (DuFour et al., 2006).

Focus on Learning. The primary purpose of the school must be to ensure that all students learn at high levels. PLCs must support important cultural changes such as a shift from a focus on teaching to a focus on student learning where learning is monitored, and interventions or enrichment are provided for students as needed (R. P. DuFour, R. B. DuFour, & Eaker, 2008).

Shared Vision. The group's mental image depicts what is most important to the school staff. Staff members should use this image as a guidepost when making decisions about teaching and learning in an effort to support each student's potential to achieve (Hord, 1997).

Collaborative Culture. Teachers work together to achieve common goals linked to the purpose of learning for all students. All members of the learning community are held accountable for the achievement of all students (DuFour et al., 2008).

Supportive Structures. These may include common planning time for the teachers, proximity of colleagues' classrooms, and a common meeting area where educators can gather to share ideas (DuFour et al., 2008).

Criterion-Referenced Competency Tests (CRCT). Georgia end-of-year assessments designed to measure student acquisition of skills and knowledge set forth in mandated reading, English Language Arts, mathematics, science, and social studies content standards (GaDOE, n.d.a).

Regional Educational Service Agency (RESA). Sixteen strategically-placed agencies located throughout the state of Georgia created to share services to improve the effectiveness of instructional programs in member school systems. These service agencies assist the Georgia Department of Education in promoting its initiatives, inform school systems of innovation, and gather research on programs as needed (GaDOE, 2015).

Methodology

A completed application for the use of human participants in research was submitted to the Valdosta State University Institutional Review Board (IRB) in January 2015. Upon reviewing the completed application packet, the Review Board determined the research protocol to be exempt from IRB oversight. A copy of the final Protocol Exemption Report is attached in Appendix A.

Survey data were collected in February and March of 2015 to examine 194 teachers' perceptions of the existence of the four dimensions of a PLC within their schools. These dimensions were: focus on learning, shared vision, collaborative culture, and supportive conditions. The study examined the relationship between the teachers'

levels of education and their practice of PLC principles, as well as whether student performance was impacted by the practice of the PLC dimensions.

The population for this study was elementary schools in a Georgia RESA District. Within the RESA district, there were seven elementary schools classified as Focus, Highest Progress, and Highest Performing schools. These Georgia public schools were identified as low-performing, progressing, or high-performing by the GaDOE based on CRCT data from 2009 to 2013. One of the identified schools served only 6th grade, and one did not have PLCs, so these schools were eliminated from the study because they did not meet study population parameters. The remaining five identified schools served as the sample for this study.

All teachers involved in PLCs within the five schools were given the opportunity to participate in the research. Permission was obtained from the superintendent of each district via electronic correspondence prior to conducting the study (see Appendix B). The principal of each school was also contacted prior to distribution of the survey instrument (see Appendix C). A brief description of the study, attached in Appendix D, was provided to each superintendent and principal along with the request to survey teachers. Principals were asked to sign and return a letter of cooperation granting permission to conduct the study within their buildings. This letter is attached in Appendix E.

The survey utilized was based on the survey instrument used in Passi's (2010) study and consisted of 40 statements concerning the four dimensions of PLCs. Participants were asked to respond to 10 additional statements to rate the level to which

they had been trained in the various PLC dimensions and the level to which these dimensions were actually being practiced in their schools.

Student achievement data for 3rd, 4th, and 5th grade students in each of the selected Focus, Highest Progress, and Highest Performing schools were collected in the form of grade level averages from the Georgia Governor's Office of Student Achievement (GOSA) Report Card (GOSA, n.d.a). Percentages of students scoring in the *Meets* and *Exceeds* ranges on the Reading, English Language Arts, and Mathematics sections of the CRCT for 2011, 2012, 2013, and 2014 were examined to find whether a significant relationship existed between student CRCT scores and teacher practice of PLC principles.

Significance of the Study

While there is a broad range of information concerning PLCs found in professional literature, these publications often simply provide organizational guidelines or a description of the processes and stages that participants encounter as they establish PLCs in their buildings (Feger & Arruda, 2008). However, there is still a need for rigorous research and evaluation of PLCs and their impact on teaching and learning (Feger & Arruda, 2008; Hord, 1997; Vescio et al., 2008). Therefore, this study sought to investigate the impact of PLCs on student achievement. The results will provide school administrators, teachers, and those in other educational settings with additional information, guidance, and support as they consider the development and implementation of the PLC concept.

Furthermore, this study has the potential to lead administrators to decide if developing PLCs within their systems could be a wise investment of time and school

resources. Additionally, administrators can discover methods or tools to measure various dimensions of PLCs. This information can then be used to determine which dimensions have the most impact on student achievement.

Assumptions of the Study

This study assumed that most teachers in Georgia's public schools had a basic understanding of PLCs. While they may not have received formalized training in college classwork or through specific staff development workshops, most teachers are likely to have been exposed to the various components of PLCs through collaboration, conferences, resource materials, or teacher websites.

Limitations of the Study

Several factors limited the generalizability of the results of this study. The socio-economic level of the students in the targeted schools, as well as the assessment tool used to measure student achievement could limit the extent to which the results could be compared to others. The schools involved were not randomly selected; instead, they were purposively selected based on their designation as a Focus, Highest Progress, or Highest Performing elementary school in the RESA District. Similarly, only elementary school teachers in rural Georgia were included, so the results may not be generalizable to other grade levels or demographic areas of the country. Furthermore, teachers were only surveyed one time for this study; an annual follow-up survey would improve the validity of the measure of implementation of PLC principles.

Varying levels of training in PLC practices, years of classroom experience, or length of tenure in a current position also could have impacted teachers' responses and limited the extent to which conclusions may apply to all public schools in general.

Additionally, self-reported data gathered through the use of the survey instrument may have been adversely influenced by participants' negative feelings toward required PLC meetings during or after the school day (Woodland & Mazur, 2015). The absence of classroom observational data to validate teachers' self-reported survey responses further limited the generalizability of the study.

Organization of the Study

This study is divided into five chapters. Chapter 1 provides an introduction to the topic of PLCs. A review of literature in Chapter 2 introduces the impact and influence of PLCs, particularly at the elementary school level. Information and research on the impact of PLCs are presented and linked to student achievement. Chapter 3 presents the methodology employed to collect and analyze quantitative data from current teachers of identified public elementary schools in the Georgia RESA District. The results of the study and interpretation of the findings are presented in Chapter 4, and conclusions drawn from the study are discussed in Chapter 5.

Chapter II

REVIEW OF LITERATURE

DuFour and Eaker (1998) reviewed much of the literature written about PLCs through the years as schools shifted away from the factory model of the late 1900s to the current concept of continuous improvement. Many prior studies concerning PLCs focused on implementing and sustaining learning communities in schools, improving professional collaboration through PLCs, and investigating the impact of these learning communities on student achievement (AISR, 2004; Borko, 2004; Hord, 2008; Jackl & Lougée, 2012; Learning Point Associates, 2009; Strahan, 2003; Vescio et al., 2008; Voelkel, 2011). The purpose of this study was to investigate how teachers described the four dimensions of a PLC, as well as how teachers' levels of education compared to their practice of PLC principles. The study compared the academic performance of schools to determine whether the practice of PLC dimensions impacted academic performance, as well.

The literature review details the progression of the PLC movement, explains the four dimensions of the PLC, and provides an overview of past studies documenting the impact of learning communities upon student achievement. Furthermore, this review explains how educators can work together to develop PLCs, it clarifies benefits and possible limitations of these communities, and it describes various PLC models. Finally, the literature review concludes with an overview of the function of PLCs within Georgia's public education system.

History of the Professional Learning Community

The Center for Comprehensive School Reform and Improvement website (Learning Point Associates, 2009) asserts that the PLC concept is often misused to refer to weekly meetings where teachers examine data and make informed decisions. However, the website further states that the work of PLCs actually represents a major paradigm shift in school improvement efforts as PLCs move the work of school reform from *restructuring* to *reculturing*. Within this reformed schoolwide culture, the underlying belief is that teachers work in ongoing, high-performing, collaborative teams to enhance their leadership capacity and to improve student learning.

According to DuFour and DuFour (n.d.), researchers began to use the term PLC in their writings in the 1960s to describe an alternative to the inherently isolated nature of the teaching profession in the United States. Hord (2008) concurred that teachers throughout history worked mainly in isolation, closing their classroom doors and teaching from their knowledge of curriculum and instruction. This state of isolation began to disappear in the 1980s as educators started to teach in open classrooms and collaborative teams (R. P. DuFour & R. B. DuFour, n.d.; Hord, 2008). Teachers began to discuss the workplace and morale, as well as content knowledge and skills taught. As this shift led to the removal of physical barriers and isolation, educators began to come together to share their work, resulting in significant improvement in motivation and morale (Hord, 2008).

Hord (2008) reported that in the early days of collaboration, teachers primarily carried out managerial tasks such as ordering textbooks and supplies, scheduling field trips and special events, and occasionally sharing a classroom activity or conference report. Through these meetings, colleagues were able to successfully organize their plans

and activities. As team teaching and collaborating on instructional strategies and programs grew from teachers' meetings, school districts began to see the value in teacher collaboration (Hord, 2008). Because some teacher learning resulted from this type of collaboration, many educators thought of working collaboratively as the main focus of PLCs. In fact, many educators continued to utilize this pattern in their PLCs (Hord, 2008). However, DuFour and DuFour (n.d.) insisted that, to become a true PLC, the focus of the relevant question had to shift from teachers' *teaching* of content to the students' *learning* of content.

With the introduction of student learning standards, teachers and administrators discovered a need to become more intentional in their study of strategies to enable learners to reach increased levels of expectations (Hord, 2008). As a result, communities of professional educators began to develop for the purpose of improving learning. These early PLCs examined assessment data from multiple sources to pinpoint areas of strength and weakness in student learning. From these findings, educators began the work of determining what they must learn in order to become more effective teachers for their students (Hord, 2008).

Researchers with AISR (2004) described PLCs as "groups of educators, administrators, community members, and other stakeholders who collectively examine and improve their own professional practice" (p. 2). These small groups met regularly over a period of time; focused on data, standards, instruction, equity, and results; expanded participants' knowledge; and encouraged innovation and excellence. PLCs required educators to be open and honest with themselves and with members of the group as they continually sought ways of improving their work. Striving for continual growth,

PLC participants desired to change the nature of schools by encouraging the evolution of teaching and learning (AISR, 2004).

Similarly, Pirtle and Tobia (2014) found that where teachers felt encouraged by their leaders, they supported one another's practice in PLCs, felt more confident in themselves, developed a stronger sense of self-efficacy, and believed in their ability to influence student learning and achievement. As a result, teachers were more committed to their collaborative work to meet students' individual learning needs. The researchers further found that teachers felt affirmed in knowing they could bring their instructional challenges to fellow PLC members for help in adjusting classroom instruction, improving their teaching abilities, and incorporating learned strategies into their repertoire of skills (Pirtle & Tobia, 2014).

On the other hand, researchers with AISR (2004) identified several barriers to effective PLC implementation. For example, some groups focused too strongly on processes, protocols, and norms rather than the important work of content and instructional practices. In other groups, members examined student and teacher work, but they found themselves reluctant to scrutinize the work deeply enough to result in changes to the delivery of classroom instruction because of the difficulty in addressing trust and equity issues among group members. Another obstacle noted was a lack of development of leadership capacity. While instructional coaches became catalysts for collaboration in PLCs, building- and system-level leaders often did not understand how they could further support the important work of learning communities (AISR, 2004). Additionally, AISR (2004) pointed out that many groups failed to collect documentation

to support their belief that improvements in instruction and student achievement were truly the result of their work in PLCs.

Finally, while school systems provided supportive structures such as time, space, and autonomy for their PLC members to meet, they often failed to understand that these conditions alone did not ensure real changes in classroom practices (AISR, 2004). Similarly, Wood (2007) stated that administrators often said they wanted their teachers to participate fully in PLCs, taking ownership of the process and increasing their level of responsibility for student learning; however, these same administrators sometimes made top-down decisions which inadvertently undermined the teachers' faith in the PLC process.

Because of these potential stumbling blocks, DuFour (2004) asserted that the primary mission of the PLC model was to ensure student learning. He further stated that the PLC movement could avoid the fateful demise experienced by previous school reform efforts if educators remained faithful to the core principles of PLCs until the model became embedded throughout the school culture.

For example, Borko (2004) conducted research to discover evidence that participation in PLCs positively impacted both teaching and learning. In a multiyear, multifaceted study of mathematics teachers and their classrooms, the researcher uncovered evidence of increases in teachers' knowledge and understanding of subject matter. In one part of the program, teachers attended a 2-week summer institute and monthly follow-up workshops throughout the school year. During the summer institute, instructors provided activities for the teachers to build trust and feelings of safety to explore unknown mathematics concepts. In the workshops during the school year, the

focus shifted to strategies for teaching algebraic reasoning. Over time, the researchers found changes in teachers' understanding of mathematical content, as well as their feelings of connectedness with fellow PLC members. Borko's (2004) findings provided evidence that strong PLCs increased teachers' use of cognitively challenging tasks, and in turn, students' mathematical explanations improved, as well.

Dimensions of the Professional Learning Community

To become truly successful learning communities, educators must understand and adhere to the fundamental dimensions of PLCs. DuFour et al. (2008) described these as focus on learning, shared vision, collaborative culture, and supportive structural conditions. These authors defined a focus on learning as the primary purpose of the school, which included ensuring that all students learned at high levels. The researchers believed a PLC included important cultural changes such as a shift from a focus on teaching to a focus on student learning where this learning was monitored, and interventions or enrichment were provided for students as needed.

One example of the impact an increased focus on learning can produce was found in a study of 218 PLC members and 33 learning community coaches who worked in an American mid-Atlantic city school district. Wood (2007) found that 92.8% of participants reported having more collegial conversations after PLCs were established compared to 84.1% before, and 54.1% received more feedback and suggestions from their colleagues afterwards compared to 36.6% before. Moreover, the researcher reported that 61% of teachers' discussions focused on student work samples after PLCs began compared to 44.3% before, and 72.2% of their discussions focused on problems concerning classroom practice after participation in the PLCs compared to 54.4% before.

DuFour et al. (2008) also believed PLC participants must define a shared vision. Hord (1997) described this shared vision as a mental image of what was most important to a school staff. She encouraged staff members to use this image as a guidepost when making decisions about teaching and learning in an effort to support each student's potential to achieve. To accomplish this goal, a collaborative culture was of utmost importance in a PLC. This community was comprised of teachers who worked together to achieve common goals linked to the purpose of learning for all students (DuFour et al., 2008). In this culture, all members of the learning community were held accountable for the achievement of all students within the school. To facilitate this high level of collaboration and accountability, supportive structures such as common planning time for groups of teachers, proximity of colleagues' classrooms, and a common meeting area where educators could gather to share ideas were also necessary for successful PLCs (DuFour et al., 2008).

Stoll, Bolam, McMahon, Wallace, and Thomas (2006) discussed the critical nature of building capacity for these fundamental dimensions of strong PLCs. These researchers asserted that the progress of educational reform hinged upon teachers' individual and collective capacity for stimulating student learning. They explained that capacity was a complex set comprised of motivation, skill, positive learning, organization, culture, and supporting infrastructure. Stoll et al. (2006) insisted that when the right teachers, school communities, and school systems came together, they were empowered to get involved and to sustain professional learning over time. However, as DuFour (2004) emphasized, even if a group of teachers claimed to be a PLC, their success was not guaranteed. A school was most likely to become more effective when

educators were willing to commit to the hard work and discipline required to implement the core dimensions of PLCs (DuFour, 2004).

In a qualitative case study of three schools in Australia, Owen (2014) also identified pivotal PLC characteristics which heightened the impact of professional learning. The researcher collected school documentation, conducted teacher interviews and focus groups, and surveyed primary and secondary teachers. Through this study, she documented highly positive survey responses identifying teachers examining student data, co-assessing student work, learning from one another, and adopting innovative strategies with support from their team members not only improved teachers' practices, but also increased student learning, as well. Furthermore, Owen (2014) identified the importance of school leaders in nurturing PLCs, providing financial support, and setting clear expectations as playing a primary role in transforming educational practices and student learning.

In an article highlighting a similar study, Datnow (2011) described her experiences in conducting qualitative research in two urban school districts known for their positive outcomes related to data-driven decision making. One of the districts was located in California, and the other was located in Texas. The author indicated that the research team conducted on-site interviews with approximately 50 individuals, including central office administrators, building-level administrators, and teachers from varied grade levels and academic disciplines. Additionally, the team collected data through classroom observations, focus group meetings, and teacher development workshops to triangulate their findings.

Among the most important dimensions of PLCs identified in the study, Datnow (2011) described structured time for collaboration, specific expectations regarding how meetings would be conducted, protocols for use in data discussions, strategies for staying motivated and self-confident, and sharing of ideas for teaching. However, the author further reminded school leaders that increased collaboration added to teachers' workload. To offset this negative characteristic, Datnow (2011) suggested that leaders must ensure teacher flexibility to make changes in classroom instructional strategies, pacing guides, curriculum, teaching materials, and student grouping plans.

Student Achievement and the Professional Learning Community

In a review of research examining the impact PLCs have on teachers and students, Vescio et al. (2008) reviewed 10 empirical studies of teacher collaboration in learning communities within the United States and one large multi-site research report published in England. All of these studies reported data documenting the impact of PLCs on teaching practice and/or student learning. First, the researchers examined what the studies conveyed about how educators changed their teaching practices and found that PLC participants' practices became more student-centered over time. For example, some teachers increased flexibility in their classroom arrangements, some varied their lesson pacing to meet the needs of learners, and others improved classroom pedagogy to use higher order thinking strategies as a result of their PLC participation.

Vescio et al. (2008) found all 11 studies cited data supporting fundamental shifts in the schools' professional cultures and the habits of mind teachers brought to their classrooms. The researchers noted that the most successful PLCs shared four common characteristics: the teachers participated in open collaboration, the groups focused on

student learning, the participants exercised some authority over their own learning and various aspects of school governance, and the members participated in continuous teacher learning to accomplish their goals.

Finally, Vescio et al. (2008) found that eight of the 11 studies examined the connection between PLC participation and student achievement. The studies documented improvement in student learning as measured by increases in test scores and other measures of student achievement. The researchers concluded that student achievement increased the most where PLCs were highly involved and teachers focused persistently on student learning and achievement data.

Another large study was conducted by the Wake County Public School System (WCPSS), the largest district in the state of North Carolina and the 16th largest district in the nation. WCPSS implemented PLCs in 2003 in an effort to improve graduation rates and better prepare students for post-secondary education and the workforce (Jackl & Lougée, 2012). In 2006-2007, PLC implementation became a key strategy for achieving the district mission, and evaluation specialists began to collect data to determine the impact on teachers and student achievement.

Jackl and Lougée (2012) reported that more than 80% of WCPSS teachers agreed or strongly agreed that their work in PLCs positively impacted their teaching performance and their students' academic achievement. The researchers found that schools with high-performing PLCs had lower percentages of failing grades (e.g., in 8th grade, 3.61% in schools with high-performing PLCs compared to 5.06% in schools with low-performing PLCs), and those with high-performing PLCs had markedly lower rates of student retention (e.g., in 10th grade, 7.6% in schools with high-performing PLCs

compared to 11.2% in schools with low-performing PLCs). Finally, statistical analyses of the relationship between high-performing PLC indices and student end-of-grade and end-of-course assessment data indicated that student performance had improved significantly over time.

PLCs in Early Grades. In a qualitative study of four PLCs in Head Start centers in southern California, Fairfield (2011) observed in preschool classrooms, interviewed and surveyed teachers, sat in on monthly staff development meetings, and reviewed documentation from past PLC and leadership team meetings. Through an in-depth review of her reflexive journal entries, matrices, and logs of notes, the researcher found that patterns began to emerge across all forms of her data.

Fairfield (2011) concluded that teachers believed their participation accelerated student learning as they implemented strategies shared in their PLCs. The teachers further reported that they generated lessons and planned student experiences based on knowledge gained from their colleagues, and these new activities captured students' curiosity and created excitement among the children. Finally, the PLC participants reported an improvement in their students' learning and school readiness skills because they reviewed and interpreted assessment data in their groups and modified their instruction based on the student data.

In a 3-year study of three North Carolina elementary schools that improved low-income and minority student achievement, Strahan (2003) reported that student proficiency averages on state assessments improved from less than 50% in 1997 to more than 75% in 2002. The researcher reanalyzed data from case studies in which research teams collected demographic and achievement data, interviewed teachers and

administrators, and observed lessons and meetings at all three schools in an effort to explore their professional culture.

Strahan (2003) also conducted new interviews and observations to examine the role of teacher collaboration in the improvement of student achievement in the elementary schools. In the interviews, educators described three major ways they improved student learning. The teachers reported that they concentrated instruction on student performance, created inviting school climates, and guided reform through energetic leadership.

Further, Strahan (2003) found that teachers and administrators in all three elementary schools identified priorities for school improvement, used formal and informal assessment data to target areas for enhancement in teaching practices, and began school-based professional development to improve classroom instruction. Over time, students became more successful, PLCs grew stronger, and a culture developed to communicate high expectations to new teachers and new students. Strahan (2003) further reported that teachers depended on their colleagues for suggestions and support when they were unsure of how to meet students' needs; thus, the stage was set for continued improvement, and a renewable source of energy for PLC participants developed.

In a mixed-methods study, Voelkel (2011) described one California school as the lowest performing elementary school in its district. When the school was unable to meet federally-mandated Adequate Yearly Progress (AYP) requirements for school-wide and statistically-different subgroups in English Language Arts (ELA) and mathematics, it was labeled a level four Program Improvement site. As a result, the faculty and staff spent 2 years under an Alternative Governance Board.

Voelkel (2011) reported that the low performing school adopted PLCs as a priority for transformation in 2005, and they met AYP requirements each year through the end of the study. The researcher's data from 2006 through 2009 verified the school's percentage of students scoring at the proficient or advanced levels increased from 52% to 64% in mathematics and from 39% to 53% in ELA. These gains put the elementary school ahead of its district and the state of California in both ELA and mathematics achievement. Corresponding data collected through teacher surveys demonstrated a perception of high levels of PLC characteristics, as well as collective efficacy among the PLC team members.

PLCs in Middle Grades. Prater (2010) conducted a descriptive and causal-comparative study to determine if there was a significant difference among the perceptions of selected California middle school principals and teachers concerning their views of communication structures and strategies as they related to improved student achievement. The structures and strategies investigated were shared vision, expectations of continuous improvement, articulation between grade levels and departments, interdependent collaboration time among teacher teams, and consistent use of data to inform decisions. These structures and strategies aligned closely with what other researchers have referred to as PLC dimensions (Prater, 2010).

Prater's (2010) survey results of principals and teachers from high-performing middle schools revealed that 98% of respondents from both groups considered the five dimensions to have a significant impact on student achievement. Based on his findings, the researcher suggested that reform efforts in public education in America must combine accountability and relationships to support student achievement.

Slavit, Kennedy, Lean, Nelson, and Deuel (2011) conducted a case study to explore how teacher collaboration, centered on student data, can result in instructional changes within the context of middle school mathematics classes. Specifically, the researchers focused on the role of student learning data and the collaborative nature of teacher professional growth amongst five teachers working in the mathematics department at Silver Valley Middle School in Silver Valley, Washington. The authors documented shifts in teacher collaboration and practice in four explicit areas over a 5-year period.

First, Slavit et al. (2011) found a shift in PLC members learning to talk to each other. The researchers reported that in Year 1 of the study, teacher interactions consisted largely of broad generalizations with little sharing of specific student data, instructional perspectives, or content focus. By Year 5, the teachers changed to a focus on specific skills, instructional changes, targeted professional development, and a common desire to improve all students' mathematical development.

Second, the team members shifted in their individual use of student data to inform practice. In Year 1, the researchers reported that the teachers struggled to figure out how to collect and analyze student data, anecdotal records of classroom conversations, and peer observation data. In Year 3, the teachers began to report their focus, data collection, and analysis to the team, and they delved more deeply into their own students' mathematical thinking (Slavit et al., 2011).

Third, Slavit et al. (2011) reported a shift in PLC members' collaborative use of a variety of student data to inform teacher practice. By Years 4 and 5, the team began to focus collaboratively on their students' mathematical learning as their data collection and

analysis became much more expansive and sophisticated. The teachers identified a common area of student need and agreed, as a whole, to modify their classroom instruction to improve the area of deficiency.

Finally, the researchers found a shift in PLC members taking seriously the idea of reaching all students. In Year 5, the final year of the study, the teachers demonstrated a deep level of commitment to providing multiple forms of student-centered mathematics instruction and assessment to equitably address the curricular needs of every learner. Slavit et al. (2011) reminded educational leaders and PLC participants that shifts to new norms require long-term commitment and continued support throughout the process for all teachers involved.

PLCs in Upper Grades. To investigate a possible link between PLCs and student achievement, Passi (2010) surveyed 365 ELA teachers in three suburban New York high schools concerning their PLC practices and examined their students' 3-year average mastery rates on the New York State ELA Regents Exam. The researcher found that teachers from high-performing schools expressed a higher focus on learning, a greater agreement with a shared vision, higher rates of peer collaboration, and increased levels of supportive structures in their schools when compared with teachers from low- and moderate-performing schools.

Furthermore, Passi's (2010) findings indicated that all four of the PLC dimensions studied were related to student achievement. Specifically, the dimension of supportive structures accounted for 66% of the variance in school achievement rankings amongst the three high schools. The dimensions of collaboration and focus on learning along with the

practice of PLC constructs accounted for 32.7% of the variance in the schools' achievement rankings.

DuFour (2014) described how implementation of these PLC dimensions has also supported ongoing adult learning to impact student achievement at Adlai Stevenson High School located in a suburb of Chicago, Illinois. With an enrollment of over 4,000 students from middle- and upper-middle-class homes, the faculty has maintained three goals since the mid-1980s: to reduce the student failure rate, to increase the success rate for students participating in their most rigorous courses, and to improve student achievement on the American College Test (ACT) exam. To accomplish these goals, teachers in the school have worked as members of collaborative teams for almost 30 years.

PLC members, usually colleagues who taught the same course, followed several steps to work toward improvement. After agreeing upon specific knowledge and skills required for each unit of study, the teachers monitored student progress using common formative assessments developed by team members. When PLCs met to review assessment results, the members discussed ways to address individual students' learning needs, strategies to improve individual teachers' instructional practices, and any areas in which the team needed additional training or support (DuFour, 2014).

According to DuFour (2014), the schedule at Stevenson was designed to give each PLC a 3-hour block of time to meet each month, plus 1 extra hour every week. Additional training was offered immediately after school or during the summer for teachers interested in concepts related to team, school, or district improvement goals. This continual focus on improved professional development for adults has resulted in

remarkable gains for Stevenson's pupils. The student failure rate, which hovered around 40% before implementation of the PLC process, decreased to 3.8% in 2013. Percentages of students in advanced placement (AP) classes increased from 7% in 1985 to 85% in 2013, with 89% of students earning honor scores of 3, 4, or 5 on AP exams over the past 5 years. Finally, the average ACT exam score for Stevenson students improved from 22.0 in 1990 to 26.5 in 2013, which was 6.1 points higher than the Illinois state average (DuFour, 2014).

Conversely, Varano (2010) found no statistical significance in the relationship between the implementation of PLCs in 508 Pennsylvania high schools and student achievement on their grade 11 reading and mathematics assessments. Based on these findings, the researcher suggested that his study added credibility to the body of literature that concluded PLCs were merely a theoretical concept, not proven to yield increased organizational outcomes. However, Varano (2010) noted that his study included only survey data completed by high school principals, and he suggested further studies should include data from all stakeholders, including teachers, students, and parents.

Creating Professional Learning Communities

Although Varano (2010) found no relationship between PLCs and student achievement, Mindich and Lieberman (2012) conducted a case study of two New Jersey middle schools and reported very different results. The researchers examined the process of developing PLCs and reported these collaborative groups "have the potential to change the culture of teaching and leadership in schools" (p. 40). McLaughlin and Talbert (as cited in Mindich & Lieberman, 2012) set criteria to rank PLC quality as weak, strong traditional, or learning communities.

The researchers described teachers in weak communities as isolated and hierarchical, using a curriculum consisting largely of rote learning. In strong traditional communities, participants held regular meetings, but they tended to focus more on transmitting knowledge while teacher interaction often lacked depth. The groups described as learning communities truly worked interdependently, and they drove themselves and their students to think constructively about the work they completed. Mindich and Lieberman's (2012) study included several ideas schools may consider if they want to create the highest level of learning communities described by McLaughlin and Talbert.

First, Mindich and Lieberman (2012) advised that groups must set norms and ground rules in an effort to create purposeful meetings, to engender feelings of safety and trust among members, and to keep participants focused and on task. Next, the authors described distributed leadership between the principal, assistant principal, and teacher leaders as another important key to PLC success. This attitude of sharing power encouraged stakeholders to buy into the process and accept responsibility for all areas of school improvement (Mindich & Lieberman, 2012).

Similarly, the authors stated that administrators should be encouraged to create a sense of learning alongside teachers, promoting an atmosphere of openness about concerns and successes, and they should be urged to work creatively with teachers to carve out time for meaningful collaboration (Mindich & Lieberman, 2012). The authors further identified flexibility as a key attribute when organizing PLCs. Some groups could be organized by grade, content area, or department, while other groups could be organized around teachers' schedules or topics of interest (EdVestors, 2013; Mindich &

Lieberman, 2012). Most importantly, regardless of the organizational pattern, the authors stated the primary focus must remain centered on identifying students' needs, improving classroom instruction, using data to determine teaching strategies, and checking for student learning (Mindich & Lieberman, 2012).

Unlike off-campus staff development activities of the past, Lieberman and Miller (2011) stated the best location for professional learning would be inside teachers' schools where they could work collectively to define and solve authentic problems. These authors suggested that successful PLC members should meet regularly to build open, trusting, collegial relationships among all participants; to develop a clear purpose; to focus collectively on problems of practice; to create routines and rituals which support honest discussion and disclosure; and to engage in observation, problem solving, and peer teaching and learning activities. Participants should organize activities to enhance learning for the school's adults and students, use collaborative inquiry to initiate informed conversations based on evidence collected, develop a theory of action, and extend core strategies to connect members' learning to student learning, as well.

Chaseling, Boyd, Robson, and Brown (2014) further examined the process of developing PLCs through a case study involving an Australian primary school. In this study, the principal initiated the development of PLCs in an effort to improve his teachers' instructional skills. The principal and deputy principal established weekly meetings to develop a shared vision and collaborative culture within the building. When the school staff chose numeracy as the focus area for its strategic plan, teachers in each grade level also agreed to meet every other week in PLCs. Meeting topics included using data-proven components to teach numeracy, assessing current achievement levels, setting

effective grade level goals, planning to meet student needs, and implementing a school-wide numeracy block.

Chaseling et al. (2014) reported that data regarding the professional development process was collected in three ways: an external observer conducted unstructured observations of PLC meetings, a consultant held confidential interviews with teachers, and participants completed a staff survey. Summative results indicated that the majority of teachers found PLCs to be effective in improving numeracy results, collaboration, professional discussion, and consistency across the building.

Saphier (2014) further described specific steps for school leaders to take when creating PLCs as a means for improving student achievement. He insisted that error analysis and planning for re-teaching were critical skills for teams who wanted to get extraordinary results for students. First, the author stated that the role of school leaders must be to get all PLCs within the building to participate in skills data analysis from common assessments and formative assessments, digging deeply into the content with colleagues who teach the same subject matter. This activity must include thorough discussion of foundational skills taught prior to the task or item with which the students are struggling.

According to Saphier (2014), school leaders must ensure that meeting agendas are followed, all voices are heard, and teachers feel safe to be vulnerable with their peers, to invent new learning strategies, and to disagree and debate with one another. Furthermore, leaders must set goals for student proficiency rates, as well as goals for teachers to try re-teaching approaches and then compare pre- and post-assessment results. Additionally, Saphier (2014) described high-functioning PLCs as those whose members'

beliefs and attitudes demonstrated a commitment to effort-base ability, curiosity, responsibility for student mastery, knowledge-based teaching, and a joint obligation to get all students to an identified level of proficiency.

Benefits and Challenges of Professional Learning Communities

Odden (2011) stated that collaboration using student data to hone teaching practices was "the cornerstone for improving instructional effectiveness" (p. 26). He further explained that collaborative teacher teams could most effectively provide high quality professional development to penetrate classrooms in a systematic way, not a random or individualistic way. Grindon (2014) found this to be true as she worked within a network of educators from across the state of Kentucky to implement the Common Core State Standards in English Language Arts. This group met one day each month for 3 years to deconstruct the new standards and determine what skills and knowledge would be required for mastery at each grade level. The author noted that the members of her network provided a safe place to discuss the positive and negative experiences she encountered in the early implementation phase of the new learning standards.

Woodland and Mazur (2015) contended that PLCs and educator evaluation were "the two most powerful ideas related to professional development at work in modern education theory" (p. 7). The authors asserted that teachers and leaders could leverage the central elements of PLCs and educator evaluation to provide the foundation of instructional improvement. Insisting that teacher collaboration within PLCs improved school climate, job satisfaction, and teacher performance, Woodland and Mazur (2015) suggested an integrated, three-tiered approach to job-embedded professional

development. Based on educator performance standards, their model was designed to serve and improve the practice of all teachers.

In Tier 1, Woodland and Mazur (2015) envisioned groups of teachers participating in ongoing, disciplined cycles of inquiry. These teams would focus on improving classroom instructional practices to better meet the needs of all students. In Tier 2, the authors suggested that some teachers would access targeted, supplemental support. For example, novice teachers might need the added support of Tier 2 interventions at the outset of their careers, while more seasoned teachers might need knowledge and skills to improve a deficit or to advance their learning.

Finally, the authors visualized Tier 3 as an intense level of individualized support for a small percentage of teachers. On one hand, this tier was designed to provide last-chance remedial interventions for teachers who were ineffective in their classrooms. However, in a completely different way of thinking, Tier 3 was also designed to provide recognition and reward for outstanding teachers in an effort to reduce burnout and increase the likelihood of retaining highly-effective educators. Through this tiered approach, Woodland and Mazur (2015) referred to educator evaluation systems and PLCs as "the hammer and the hug" (p. 20) with the potential to help create effective professional development, to improve teacher performance, and to enable schools to reach key organizational goals.

The United States Department of Education (USDOE, 2013) listed many other benefits of PLCs in their Professional Development brief. For example, student achievement should improve as educators unite by a shared moral imperative and vision, and shared responsibility and accountability should improve with teachers' increased

power to make decisions from the bottom up. Furthermore, educators should be more willing to take risks and be more innovative, finding ways to collect and analyze data to pinpoint student strengths and weaknesses, and as a result, more students should be on track to graduate college- and career-ready. Educators should be better prepared to move up the career ladder as they take increased ownership of their professional learning, as well (USDOE, 2013).

On the other hand, PLCs have faced many challenges in schools. Because of the private nature of classroom instruction, Talbert (2010) noted it was often difficult for teachers to enter into peer collaboration for instruction or to allow peer observers to come into their classroom and provide feedback; teachers were often uncomfortable discussing how their teaching affected student learning. Furthermore, teacher turnover was a challenge, especially in high-needs areas as teacher leaders often sought openings in high-achieving schools, leaving behind a higher proportion of beginning teachers with fewer knowledge resources (Talbert, 2010). Additionally, as teachers felt compelled to comply with increased accountability measures, time constraints involving the need to improve student test scores often eroded away time for collaboration (Talbert, 2010).

Similarly, Koenigsberger (2015) found that PLC members struggled to find time to remove nonessential content, develop authentic learning tasks for students, or study the effects of teaching critical thinking skills. The researcher stated that high-performing PLCs must eliminate unnecessary material in order to make room for pertinent new material, although this is a difficult task.. To prepare students for an extremely competitive world beyond schooling, PLC members must also present problems in novel

situations and ensure that tests are reliable, valid, and relevant assessments of essential knowledge and important higher-order thinking skills.

Finally, Watson (2014) questioned the effectiveness of PLCs altogether and recommended a re-examination of the underlying assumption which purports the PLC as a means for teacher-led change in schools. The author suggested that the recent school improvement movement created a narrowly-defined push for PLCs to improve student achievement. Watson (2014) explained that she viewed this approach as limiting. Instead, the author suggested that PLCs should encourage teachers to seek ways to increase adaptability, diversity, and creativity.

Learning Community Models

Contrary to Watson's argument, for the most part, PLCs have been widely accepted as effective environments for professional development (DuFour, 2014). To promote teacher learning, as previously mentioned, some PLCs were organized by grade, content area, or department, while other groups were organized around teachers' schedules or topics of interest (EdVestors, 2013; Mindich & Lieberman, 2012). Researchers found that some grade level teams met once or twice weekly for 35 to 50 minutes to discuss ongoing challenges with students or other classroom issues, while subject-area groups (made up of same-grade or cross-grade teachers) often met for longer blocks of time once or twice weekly or monthly to address content issues (EdVestors, 2013). Other "specialty teams" met regularly to discuss learning goals and other challenges that would not typically be addressed in grade-level or subject-area meetings (EdVestors, 2013).

These PLCs represent more traditional types of communities, but with the surge in technology over the past few years, online learning communities (OLCs) have increased dramatically. According to Duncan-Howell (2010), the Internet has given teachers the ability to connect with others, learn collaboratively, and access resources within a social space. OLCs have been described as convenient for busy teachers who must juggle work and personal lives while adding variety and originality that traditional PLCs could not offer (Duncan-Howell, 2010).

Discovery Education (2015), edWeb (2015), Teaching Channel (2015), and BetterLesson (2014) are four examples of free OLCs. Discovery Education (2015) offers global virtual field trips, research-based professional development, and resources for teachers, parents, and students. The edWeb (2015) site offers free webinars, a blog, and access to 35 different learning communities for everything from bullying prevention to real world literacy and the Common Core standards.

The Teaching Channel (2015) currently has 944 sample lesson videos for teachers in all subject areas for pre-kindergarten through 12th grade, a question and answer section, and a blog. BetterLesson (2014) offers over 10,000 complete lessons aligned to Common Core standards created by 130 Master Teachers. These OLCs are only four of the multitude of online communities that have been created by teachers for teachers in an effort to connect educators around the globe.

In addition to OLCs, Evans (2015) described another type of online professional learning opportunity known as a personal learning environment (PLE). The author stated that with increasing expectations for individuals to take responsibility for their own professional development, growth in informal OLCs and networks for professional

learning had increased, as well. Using Twitter as an example, Evans (2015) explained that any educator using the Internet could participate in a PLE "Tweetstorm," or open brainstorming session.

Meeting online weekly or bi-weekly, PLE participants used hashtags (#) to organize their discussions. Facilitated by a moderator, the discussion events included setting the context, asking an introductory question, sharing ideas, analyzing the Tweets, and arriving at agreed upon conclusions. Evans (2015) stated that active involvement was encouraged throughout the events, and some participants followed up the Twitter sessions by posting reflections about what they had learned on their own blogs.

The Role of PLCs in Georgia Public Schools

In a more formal setting, the GaDOE's Professional Learning webpage (n.d.b) described high-quality, research-based professional learning as the primary means for strengthening educators' development and performance in order to increase student learning and achievement. In 2005, the GaDOE collaborated with the National Staff Development Council (NSDC) to produce the Georgia Standards for Professional Learning Resource Guide: District-based Professional Learning that Improves Student Achievement. The document overview explained how the educational system's reform efforts must focus clearly on teacher preparation, and it described the shift from the external workshop as the predominant professional development model to a new, expanded view involving ongoing learning experiences for teachers and administrators (NSDC, 2005).

Georgia's updated vision (NSDC, 2005) for professional learning emphasized meaningful collaboration within learning teams, mutual accountability for student

learning, and a culture of respect, trust, and innovation, as well as coaching, lesson studies, action research, and examination of student work. The guidelines stressed that professional learning must be standards-based, results-driven, and job-embedded to meet the increased level of expectation required within the state. Furthermore, the resource guide described how central office staff should work alongside building leaders to support and build capacity for school reform, rather than mandating change or simply coordinating activities through top-down directives.

The guidelines described in the previous paragraphs set the stage for PLCs within the state of Georgia, and this work continues today. One of the tools for school improvement currently in use is School Keys, a set of GaDOE standards and rubrics aligned with state initiatives for professional learning, family engagement, teacher and leader effectiveness, and student learning standards (GaDOE, 2013). School Keys are designed to measure, guide, and facilitate school growth and improvement as leaders score the rubric for each standard and then plan next action steps. In the area of professional learning, exemplary practices include collaboratively analyzing data from multiple sources to determine professional learning needs; engaging in job-embedded collaborative teams to construct knowledge, acquire skills, and provide feedback; allocating resources such as time, substitute teachers, materials, stipends, and technology to support professional learning; and engaging in relationship-building through collaboration, communication, and cooperation to improve student achievement (GaDOE, 2013).

Another major emphasis for school improvement currently underway in the state of Georgia is the Teacher Keys Effectiveness System (TKES). This uniform teacher

evaluation system consisting of 10 standards was created as part of Georgia's Race to the Top Initiative (GaDOE, 2014b). Professional learning is clearly embedded in all 10 of the TKES standards as the system is designed to assist teachers and administrators in identifying teachers' strengths and areas in need of improvement, as well as planning meaningful professional learning activities. However, professional learning is most closely associated with indicators found in Standards 9 and 10, Professionalism and Communication.

Professional growth is listed as a key attribute of the TKES Professionalism standard. The guidance documents describe effective teachers as those who invest in and take responsibility for their own learning and engage in self-directed learning, as well as learning communities with other professionals (GaDOE, 2014b). Professional learning is also vitally important in the TKES Communication standard. The guidance documents for this area describe effective teachers as those who communicate with their peers to seek advice, to share best practices, and to reflect on issues that impact teaching and student learning (GaDOE, 2014b). These activities listed in the TKES documents, as well as those found in the Georgia Standards for Professional Learning Resource Guide and the School Keys standards and rubrics, align very closely with the four dimensions of the PLC: focus on learning, shared vision, collaborative culture, and supportive structures.

Summary

As schools shifted away from the factory model of the 1900s to the concept of continuous improvement, PLCs emerged as a way for teachers and administrators to focus on implementing and sustaining learning communities while improving

professional collaboration among educators (AISR, 2004; Chaseling et al., 2014; DuFour & Eaker, 1998; Hord, 2008; Learning Point Associates, 2009). Numerous research studies at preschool, elementary, middle school, and high school levels investigated the impact of these learning communities on student achievement (Borko, 2004; Fairfield, 2011; Jackl & Lougée, 2012; Owen, 2014; Passi, 2010; Prater, 2010; Strahan, 2003; Vescio et al., 2008; Voelkel, 2011; Wood, 2007).

While most of the studies of PLCs reported positive effects on teaching practice and student learning, the change process did not take place without struggle. Change has been difficult and often painful, especially in the face of increased emphasis on high-stakes testing and teacher accountability (AISR, 2004; Wood, 2007).

DuFour (2004) reminded teachers that, even if they claimed to be members of a PLC, their success was not guaranteed. Several researchers stated that learning communities were most likely to become more effective when they committed to the difficult work of implementing the core dimensions of PLCs and focused persistently on student learning and achievement (DuFour, 2004; Hord, 2008; Learning Point Associates, 2009; Stoll et al., 2006; Vescio et al., 2008).

This study examines how teachers describe the four dimensions of a PLC, their training in PLC principles, and their actual practices within PLCs. Chapter 3 presents the methodology employed to collect and analyze quantitative data from teachers of identified public elementary schools in the Georgia RESA District. The study's results and interpretation of findings are presented in Chapter 4, and conclusions drawn from the study are discussed in Chapter 5. Ultimately, this study attempts to add to the growing

body of literature surrounding PLCs and their potential effect on the academic performance of students.

Chapter III

METHODOLOGY

Introduction

Much information concerning PLCs can be found in professional literature, but most of what has been written defines organizational guidelines and describes the processes and stages participants encounter as they establish PLCs (Feger & Arruda, 2008). Therefore, a need for rigorous research and evaluation of PLCs and their impact on teaching and learning still exists (Feger & Arruda, 2008; Hord, 1997; Vescio et al., 2008). The purpose of this study was to add to the growing body of research surrounding PLCs by examining teachers' perceptions of how their participation impacts student achievement.

Specifically, the aim of this study was to investigate teachers in a sampling of Georgia's Focus, Highest Progress, and Highest Performing elementary schools and their implementation of four dimensions of a PLC (focus on learning, shared vision, collaborative culture, and supportive structures). These factors were moderated by teachers' training in PLC principles in an effort to investigate the effects these variables might have on the actual practice of PLC principles and student levels of academic performance. This chapter describes the research design, study population, sample, survey instrument, procedures for data collection, and analysis of this study.

Research Questions

To accomplish the purpose of this study, the following research questions were addressed:

Research Question 1. Does the implementation of PLC dimensions differ among Focus, Highest Progress, and Highest Performing elementary schools?

Research Question 2. Does a significant relationship exist between teacher level of education and practice of PLC dimensions?

Research Question 3. Does a significant relationship exist between teacher practice of PLC dimensions and student performance on the Georgia CRCT?

Research Design

A quantitative research design was implemented for this study. A completed application for the use of human participants in research was submitted to the Valdosta State University Institutional Review Board (IRB) in January 2015. This application included brief descriptions of the research objectives, recruitment practices, and methodology for the study. Information regarding how participants' privacy would be protected and how confidentiality of data would be maintained was submitted along with signed letters of cooperation from the five principals. Upon reviewing the completed application packet, the Review Board determined the research protocol to be exempt from IRB oversight. A copy of the final Protocol Exemption Report is attached in Appendix A.

Surveys were conducted in February and March of 2015 to collect data regarding teachers' perceptions of the existence of four dimensions of a PLC within their schools. These dimensions included: focus on learning, shared vision, collaborative culture, and

supportive conditions. Student achievement data for 3rd, 4th, and 5th grade students in each of the selected Focus, Highest Progress, and Highest Performing schools were collected in the form of grade level averages from the Georgia Governor's Office of Student Achievement (GOSA) Report Card (GOSA, n.d.a). Descriptive and inferential statistics were used to look for possible relationships between teachers' training in PLC principles, their actual practice of PLC principles, and student achievement.

Operational Definition of the Variables

Table 1 lists the independent, moderating, and dependent variables from this study that were included in the survey instrument.

Table 1

Independent, Moderating, and Dependent Variables

Professional Learning Community Dimensions	Survey Item Number	Number of Items	Raw Score
Independent variables			
Focus on learning	1, 5, 9, 13, 17, 21, 25, 29, 33, 37	10	10-50
Shared vision	2, 6, 10, 14, 18, 22, 26, 30, 34, 38	10	10-50
Collaborative practices	3, 7, 11, 15, 19, 23, 27, 31, 35, 39, 40	11	11-55
Supportive structural conditions	4, 8, 12, 16, 20, 24, 28, 32, 36	9	9-45
Moderating variable			
Training in PLC practices	41a-50a	10	10-50
Dependent variable (RQ 2)/ Independent variable (RQ 3)			
Practice of PLC principles	41b-50b	10	10-50

Note. Adapted from Passi, 2010, p. 60

Focus on Learning. The primary purpose of the school must be to ensure that all students learn at high levels. PLCs must support important cultural changes such as a shift from a focus on teaching to a focus on student learning where learning is monitored, and interventions or enrichment are provided for students as needed (DuFour et al., 2008). Survey statements dealing with focus on learning include, "Our school has a system of interventions in place to guarantee that each student will receive additional time and support for learning if he/she experiences difficulty" (Passi, 2010, p. 143), and

"Staff members in our school have developed strategies to enrich the learning of students who have demonstrated mastery of the subject matter" (Passi, 2010, p. 144).

Shared Vision. The group's mental image depicts what is most important to the school staff. Staff members should use this image as a guidepost when making decisions about teaching and learning in an effort to support each student's potential to achieve (Hord, 1997). Survey statements referring to shared vision include, "The staff shares a vision of shared responsibility for student learning" (Passi, 2010, p. 143), and "A collaborative process exists for a shared sense of values among staff" (Passi, 2010, p. 143).

Collaborative Culture. Teachers work together to achieve common goals linked to the purpose of learning for all students. All members of the learning community are held accountable for the achievement of all students (DuFour et al., 2008). Survey statements correlating to collaborative culture include, "Teachers in our school learn together with their colleagues" (Passi, 2010, p. 143), and "Teachers in my school routinely analyze data related to student achievement" (Passi, 2010, p. 144).

Supportive Structures. These may include common planning time for teachers, proximity of colleagues' classrooms, and a common meeting area where educators can gather to share ideas (DuFour et al., 2008). Survey statements dealing with supportive structures include, "Fiscal resources are available for professional development" (Passi, 2010, p. 144), and "The school provides personnel space to collaborate with colleagues" (Passi, 2010, p. 145).

Training in PLC Practices. This includes formal or informal instruction provided to teachers regarding the dimensions of PLCs: focus on learning, shared vision,

collaborative culture, and supportive structures. Examples of survey statements regarding training in PLC practices include, "We have been trained to collaboratively review student work to improve instructional practice" (Passi, 2010, p. 146), and "We have been trained to work together to produce instructional materials" (Passi, 2010, p. 146).

Practice of PLC Principles. This represents the extent to which teachers perform the actions or utilize the strategies as described in their training of PLC dimensions. Sample survey statements correlating with practice of PLC principles include, "We actually provide feedback to peers related to instructional practices" (Passi, 2010, p. 146), and "We actually work with colleagues to judge the quality of student work" (Passi, 2010, p. 146).

Population and Sample

All elementary schools within the Georgia RESA District were the population of this study. In school year 2013-2014, there were 28,650 students in 42 elementary schools within this RESA District (GOSA, n.d.b). Focus, Highest Progress, and Highest Performing schools were purposively selected as the sample in an effort to choose schools with students performing at various levels of achievement on standardized assessments. Schools within the RESA District were selected so face-to-face meetings could be scheduled with each school's faculty to ask teachers to participate in the survey.

Seven elementary schools within the RESA District were identified as Focus, Highest Progress, and Highest Performing by the GaDOE based on CRCT data from 2009-2013. One of the identified schools served only 6th grade, and one did not have PLCs, so these schools were eliminated from the study because they did not meet study

population parameters. The remaining five identified schools served as the sample for this study. Teachers from these five elementary schools were surveyed. Table 2 presents the number of students and number of teachers in each school.

Table 2

2013-2014 Student Enrollment and Teacher Count by School

Elementary School	Number of Students	Number of Teachers	Performance Level
A	727	48	Highest Performing
B	787	46	Highest Performing
C	692	49	Highest Progress
D	513	35	Focus
E	676	45	Focus

Note. Governor's Office of Student Achievement (n.d.b).

Subjects for this study were certified teachers who worked in the identified schools. All teachers who were PLC members were given the opportunity to participate in this study. Based on conversations with the principals, it was understood that only teachers who participated in PLCs should complete the surveys. Recruitment practices included contacting the principal from each Focus, Highest Progress, and Highest Performing elementary school within the Georgia RESA District to ask if his or her faculty was involved in PLCs. Five principals indicated their teachers were involved in PLCs, so permission was requested from district superintendents (see Appendix B) and the principals (see Appendix C) for teachers to participate in the survey. A brief

description of the study, attached in Appendix D, was provided to each administrator along with the requests. Principals were asked to sign and return a letter of cooperation granting permission to conduct the study within their schools. A copy of this letter is attached in Appendix E.

A face-to-face meeting was scheduled with each school's faculty to ask teachers to take part in the survey. No compensation was employed to recruit participants. Completion of the survey served as each teacher's voluntary agreement to participate in this research project and certification that he or she was 18 or older. No written consent forms were collected; however, informed consent was provided to participants through a statement read prior to completion of the survey (see Appendix F).

To protect participants' privacy, the nature of the project was explained, and then teachers were allowed to complete the self-administered surveys on their own. Participants were asked to place their surveys in a large manila envelope as they exited the room. No personally identifiable information (name of the respondent, school affiliation, etc.) was collected through the use of the survey. Any surveys that inadvertently included names or other identifying information were immediately destroyed.

To maintain participants' anonymity, survey responses were input into an electronic database, and the original survey forms were placed into a locked file cabinet to be retained for a period of 3 years. All electronic data were kept confidential and stored on a password protected computer to limit access to those involved in the research project.

Respondent Demographics

The sample of potential respondents for this study was teachers from the Georgia RESA District working in five elementary schools identified as Focus, Highest Progress, and Highest Performing schools. These designations were based on CRCT data from 2009 to 2013.

A total of 194 teachers participated in the study. All 194 surveys were returned, resulting in a return rate of 100%. Of the respondents, 184 (95%) were female, 8 (4%) were male, and 2 (1%) had missing data. When asked their level of higher education, 57 (29%) reported having a Bachelor's degree, 73 (38%) reported a Master's degree, 54 (28%) reported a Specialist's degree, 5 (2.5%) reported a Doctor of Education degree, none reported a Doctor of Philosophy degree, and 5 (2.5%) had missing data.

Instrumentation

This study collected survey data concerning teachers' perceptions of their implementation of PLC dimensions, as well as their training and practice of PLC principles. The survey was based on the instrument used by Passi (2010) in his study of high school PLCs in New York. Permission to perform a similar study was granted by Dr. Passi via electronic correspondence (see Appendix G).

The survey instrument consisted of 40 closed-ended statements concerning the four dimensions of PLCs. Participants were asked to read each statement and indicate their personal degree of agreement with each statement based on a 5-point Likert scale from 1 (S*trongly Disagree*) to 5 (S*trongly Agree*). Participants were asked to respond to 10 additional statements to rate the amount of building- or district-level training they have received in the various PLC dimensions (questions 41a – 50a) and the level to

which these dimensions have actually been put into practice in their schools (questions 41b – 50b) using the same 5-point Likert scale from 1 (S*trongly Disagree*) to 5 (S*trongly Agree*). The survey instrument is attached in Appendix H.

Survey Development

Passi's (2010) survey evolved from the work of Nasta (2007) who revised the survey "Professional Learning Community Assessment" created by Olivier, Hipp, and Huffman (Huffman & Hipp, 2003). This survey was based on the work of Hord (1997) at the Southwest Educational Development Laboratory (SEDL).

Hord's questionnaire, "School Professional Staff as Learning Community," was used to identify schools as PLCs (Passi, 2010). Along with questions based on Nasta's work, Passi also incorporated items from the survey instrument "An Audit of Our Commitment to Key PLC Concepts" by R. P. DuFour, R. B. DuFour, and Eaker (2007). Table 3 provides a visual timeline of the survey instrument development.

Table 3

Survey Development Timeline

Instrument Title	Researcher(s)	Year
School Professional Staff as Learning Community	Shirley Hord	1997
Professional Learning Community Assessment	Dianne Olivier, Jane Huffman, and Kristine Hipp	2003
Professional Learning Community Assessment-Revised	Marian Nasta	2007
An Audit of Our Commitment to Key PLC Concepts	Richard DuFour, Rebecca DuFour, and Robert Eaker	2007
Professional Learning Communities Assessment	Gaurav Passi	2010

Survey Instrument Validity and Reliability

Validity refers to how well a test actually measures what it is supposed to measure (Rudestam & Newton, 2007). To measure face validity, the researcher examines the operationalization to see whether it appears to be a good translation of the construct (Trochim, 2006). To ensure face validity of the survey questions to be used in this study, Passi (2010) invited a jury of five high school teachers to place each of the 40 questions into one of four categories related to PLCs. Additionally, the jury assessed the 10 questions relating to training in PLC principles for clarity of meaning by marking each one yes or no to indicate if it was clear in its meaning (Passi, 2010).

Construct validity is the degree to which the researcher can legitimately make inferences from the operationalizations in the study to the theoretical constructs upon which the operationalizations were actually based (Trochim, 2006). To ensure construct validity, Passi (2010) conducted a factor analysis of 365 survey participants' responses to verify the degree to which each item measured what it was designed to measure. He utilized an Equamax rotation method with maximum likelihood extraction in the survey analysis. Passi (2010) deleted or changed some survey items as a result of the factor analysis.

Reliability refers to a measure's ability to consistently produce similar results (Rudestam & Newton, 2007). Passi (2010) calculated the reliability of each of the six subscales within the survey using a Cronbach alpha analysis of the internal consistency within each scale, resulting in a range of .79 to .91. He examined each item to find whether the alpha coefficient would increase if the item were removed. Every removal

resulted in a decrease in the alpha coefficient, so all items in the subscales were retained (Passi, 2010).

CRCT Validity and Reliability

According to the GaDOE (2014a), a high degree of validity was ensured for Georgia's CRCT assessments because they measured student mastery of the state curriculum as intended. Through the process of test development, the creators ensured that the assessments were aligned with the curriculum, constructed according to test and item specifications, field tested, and reviewed by multiple educators, content experts, and psychometricians.

Similarly, the GaDOE (2014b) reported several reliability indices for the CRCT program, including Cronbach's alpha reliability coefficient and the standard error of measurement. Using these statistical indices, members of the GaDOE Assessment Research and Development staff ensured that scores reported to pupils provided a reliable picture of student performance.

Data Collection

This research study was used to gather quantitative information from a group of elementary school teachers through the use of a survey. Permission was obtained from the superintendent of each district and principal of each participating school to distribute the survey instrument in a faculty meeting. All teachers who were PLC members within the schools were given the opportunity to participate, and results from all completed surveys were included in the study. The self-administered survey instrument was used to collect data regarding teachers' perceptions of the existence of the four dimensions of a

PLC within their schools. These four dimensions included focus on learning, shared vision, collaborative culture, and supportive structural conditions.

Student achievement data for 3rd, 4th, and 5th grade students in each of the selected Focus, Highest Progress, and Highest Performing schools were collected in the form of grade level averages from the Georgia Governor's Office of Student Achievement Report Card (GOSA, n.d.a). Percentages of students scoring in the *Meets* and *Exceeds* ranges on the Reading, English Language Arts, and Mathematics sections of the CRCT for 2011, 2012, 2013, and 2014 were examined. Table 4 lists the mean mastery rate for each grade and subject area as reported for all schools included in the study.

Table 4

2011-2014 Average Mastery Rates on CRCT Assessments

School	Performance Level	Percentage of Students Scoring *Meets* or *Exceeds*					
		Reading		English Language Arts		Mathematics	
A	Highest Performing	Grade 3	98	Grade 3	98	Grade 3	93
		Grade 4	99	Grade 4	98	Grade 4	96
		Grade 5	100	Grade 5	97	Grade 5	100
B	Highest Performing	Grade 3	96	Grade 3	94	Grade 3	86
		Grade 4	96	Grade 4	95	Grade 4	91
		Grade 5	99	Grade 5	98	Grade 5	97
C	Highest Progress	Grade 3	97	Grade 3	93	Grade 3	81
		Grade 4	87	Grade 4	84	Grade 4	70
		Grade 5	93	Grade 5	91	Grade 5	91
D	Focus	Grade 3	91	Grade 3	88	Grade 3	66
		Grade 4	85	Grade 4	87	Grade 4	82
		Grade 5	96	Grade 5	90	Grade 5	88
E	Focus	Grade 3	94	Grade 3	85	Grade 3	76
		Grade 4	88	Grade 4	85	Grade 4	78
		Grade 5	93	Grade 5	92	Grade 5	89

Note. Governor's Office of Student Achievement (n.d.a).

Schools A and B are classified as Highest Performing Schools by the GaDOE, so they are among the 5% of Georgia Title I schools with the highest performance for the "All Students" group ($n \geq 30$) over 3 years, and they made Adequate Yearly Progress in 2011. School C is classified as a Highest Progress School, so it is among the 10% of Georgia Title I schools with the highest progress in performance for the "All Students" group ($n \geq 30$) over 3 years. Schools D and E are classified as Focus Schools, so they are among the Georgia Title I schools with the largest within-school gaps between the highest-achieving subgroups and the lowest-achieving subgroups (GaDOE, 2012).

Data Analysis

Research Question 1. Does the implementation of PLC dimensions differ among Focus, Highest Progress, and Highest Performing elementary schools?

Research Question 1 was answered using a between-group one-way analysis of variance (ANOVA) to investigate significant differences among teachers' implementation of PLC dimensions in their schools. An ANOVA is used when the researcher wants to compare the mean scores of two or more groups on a continuous variable, but she only wants to look at the impact of one independent variable on the dependent variable (Pallant, 2005).

An *F* ratio is calculated to represent the between-group variance, divided by the within-group variance. A large *F* ratio indicates more variability between groups (caused by the independent variable) than within groups (Pallant, 2005). An ANOVA will reveal if the groups differ, but it will not pinpoint where the significant difference is. To find out which groups are significantly different from one another, the researcher can conduct *post hoc* comparisons (Pallant, 2005).

To run a one-way ANOVA, six assumptions must be considered. First, the researcher must have one dependent variable that is measured at the continuous level. For this question, the implementation of PLC dimensions, measured through teacher surveys using a Likert scale, was the dependent variable measured at the continuous level, meaning assumption one was met.

Second, there must be one independent variable consisting of two or more separate, categorical groups. The performance level groups of Focus, Highest Progress, and Highest Performing schools, as designated by the GaDOE, met assumption two.

Third, the researcher must have independence of observations. To meet this assumption, there must be no relationship between the groups' observations or between the members of the separate groups. Assumption three was met because there were different participants in each survey group based on the school in which they worked, and each school was surveyed separately.

Fourth, in any group of the independent variable, there should be no unusual scores with extremely small or large values compared to other scores within the group. Known as outliers, these scores can negatively affect test results by exerting a large amount of influence over the mean and standard deviation for the group (Lund, A., & Lund, M., 2013). For this reason, outliers are especially important to consider when working with smaller sample sizes. The program Statistical Package for the Social Sciences (SPSS) was utilized to create boxplots of the study's data. These boxplots were checked for outliers using visual inspection.

Fifth, the researcher must ensure that the dependent variable is approximately normally distributed for each group of the independent variable. Because the sample size was greater than 50, Normal Q-Q plots generated using SPSS were visually inspected.

Sixth, the researcher must assess the data for homogeneity of variances to ensure that each group of the independent variable has the same population variance. To test this assumption, Levene's test of homogeneity of variances was utilized within SPSS, and results were evaluated to find the significance value (p-value) for each group. According to A. Lund and M. Lund (2013), if Levene's test is statistically significant ($p < .05$), the variances are not equal, and the assumption of homogeneity is violated. Conversely, the authors explain that if Levene's test is not statistically significant ($p > .05$), the variances

are equal, and the assumption of homogeneity is met. If the researcher has homogeneity of variances, a one-way ANOVA can be run without modifications. However, if homogeneity of variances is violated, the researcher must interpret the Welch ANOVA. Both of these procedures are described in the following paragraphs.

When it was determined that the first three assumptions were met for Question 1, the one-way ANOVA procedure within SPSS Statistics was utilized. The implementation of each PLC dimension was entered as the dependent variable, and school performance level group (Focus, Highest Progress, and Highest Performing) was entered as the independent variable. The options of descriptive statistics, homogeneity of variance, Welch ANOVA, and means plot were selected, along with Tukey's and Games-Howell *post hoc* tests.

First, the resulting boxplots were inspected to determine if there were outliers in any of the groups. When this procedure revealed a small number of outliers in the data, the individual case numbers were examined within the raw data file. It was determined that the outliers were the result of very few participants selecting 1 or 2 on the Likert scale to indicate *Strongly Disagree* or *Disagree* with the level of implementation of the PLC dimensions in only a few cases.

A. Lund and M. Lund (2013) indicated that when outliers are neither the result of data entry error nor a measurement error, they are likely to be genuinely unusual data points, so there is no good reason to reject them as invalid. The authors further indicated that one way to evaluate whether the outliers had an appreciable effect on the analysis is to run the ANOVA without the outliers and then compare the results. When the results

without the outliers were very similar to those of the original analysis, the decision was made to include the outliers, even though they violated assumption four.

Next, visual inspection of Normal Q-Q plots revealed that the practice of all PLC dimensions were normally distributed for Focus, Highest Progress, and Highest Performing schools, meaning assumption five was met. Descriptive statistics were then examined to find whether there were equal numbers of participants in each group, which groups had higher and lower mean scores, and if the variation in each group was similar.

To assess for assumption six, homogeneity of variances, Levene's test was utilized. Examination of resulting *p*-values indicated homogeneity of variance for eight of the ten PLC practices, but the assumption was violated for the remaining two practices.

For the eight variances that were equal, or homogeneous, the standard one-way ANOVA was interpreted along with Tukey's *post hoc* results to pinpoint exactly where differences were found between groups. For the two variances that were unequal, or heterogeneous, the Welch ANOVA was interpreted along with Games-Howell *post hoc* test results when the Welch ANOVA was statistically significant.

Research Question 2. Does a significant relationship exist between teacher level of education and practice of PLC dimensions?

Research Question 2 was answered using a correlation analysis statistical procedure, Pearson's Product Moment correlation analysis. Pearson's correlation is used when the researcher wants to explore the strength of the relationship between two continuous variables (Pallant, 2005). The Pearson's correlation coefficient (*r*) can be valued from -1 to +1, with the sign indicating a positive or negative correlation. A

positive correlation indicates that as one variable increases, so does the other; a negative correlation indicates that as one variable increases, the other decreases (Pallant, 2005).

The size of the absolute value of the correlation coefficient indicates the strength of the relationship, with a perfect correlation of 1 or -1 indicating that the value of one variable can be determined precisely by knowing the value of the other variable. Conversely, a correlation of 0 indicates no relationship between the two variables, so knowing the value of one variable would not help in predicting the value of the other (Pallant, 2005). In this study, Pearson's correlation was used to investigate the relationship between teacher level of education and practice of PLC dimensions.

To run a Pearson's correlation, four assumptions must be considered. First, the two variables being studied must be continuous. For this question, both the independent variable of teacher level of education, measured through demographic data indicating highest degree earned, and the dependent variable of practice of PLC dimensions, measured using a Likert scale, were measured at the continuous level, meaning assumption one was met.

Assumption two, requiring a linear relationship between the two variables, and assumption three, requiring no significant outliers, were both checked by creating scatterplots within SPSS. Visual inspection of the scatterplot results revealed that the relationship between teacher level of education and the practice of each PLC dimension was linear, meaning assumption two, linearity, was met. Further inspection of the scatterplots indicated no significant outliers in the data, meaning assumption three was met, as well.

Next, bivariate normality was assessed by testing teacher level of education and practice of PLC dimensions for normality using SPSS. Because the sample size was greater than 50, Normal Q-Q plots were visually inspected. PLC practice of all dimensions were found to be normally distributed for all levels of teacher education, so assumption four was met.

When all preliminary analyses revealed that none of the underlying assumptions had been violated, Pearson's Product Moment correlation procedures were performed within SPSS. The resulting correlations tables were used to find Pearson's correlation coefficients (r), as well as significance levels (p-values) to determine the strength of the relationship between teacher level of education and the actual practice of the various PLC dimensions.

Research Question 3. Does a significant relationship exist between teacher practice of PLC dimensions and student performance on the Georgia CRCT?

Similarly, Research Question 3 was answered using a Pearson's Product Moment correlation analysis to explore the strength of the relationship between the two continuous variables of teacher practice of PLC dimensions and student performance on Georgia's CRCT. The four assumptions described in the preceding paragraphs for Question 2 were again considered for Question 3. For this question, both the independent variable of teacher practice of PLC dimensions, measured using a Likert scale, and the dependent variable of student performance on CRCT, measured by school designation as Focus, Highest Progress, or Highest Performing, were measured at the continuous level, meaning assumption one was met.

Assumption two, linearity, and assumption three, outliers, were checked by creating scatterplots within SPSS. Visual inspection of the scatterplot results revealed that the relationship between teacher practice of PLC dimensions and student performance on CRCT was linear, meaning assumption two was met. Further inspection of the scatterplots indicated no significant outliers in the data, so assumption three was met, as well.

Next, bivariate normality was assessed using SPSS by testing teacher practice of PLC dimensions and student performance on CRCT as measured by school designation as Focus, Highest Progress, and Highest Performing. Because the sample size was greater than 50, Normal Q-Q plots were visually inspected. The practice of all PLC dimensions was found to be normally distributed for all school designation levels, meaning assumption four was met.

When all preliminary analyses revealed that none of the underlying assumptions had been violated, Pearson's Product Moment correlation procedures were performed within SPSS to explore the relationship between the two variables. The resulting correlations tables were used to find Pearson's correlation coefficients (r) and significance levels (p-values) to determine the strength of the relationship between teacher practice of the PLC dimensions and student performance on the Georgia CRCT as indicated by each schools' designation by the GaDOE as Focus, Highest Progress, and Highest Performing.

As an extension of Pearson's correlation, partial correlation analysis was further used to test if teacher training in the PLC dimensions was a moderating variable on the statistically significant relationships between teacher practice of PLC dimensions and

student performance on CRCT as indicated by each school's level of performance. Partial correlation allows the researcher to control for the possible effects of a confounding variable by removing its effect and giving the researcher a more accurate picture of the relationship between the two variables being studied (Field, 2009).

Using SPSS, partial correlations were completed to control for the effect of training on the relationship between teacher practice of PLC dimensions and student achievement. In these statistical procedures, the first-order correlation coefficients indicated how much of the variance was unique to the independent and dependent variables. To calculate the percentage of the variance contributed by each variable, the correlation coefficients were squared (R^2).

Null Hypotheses

The complete null hypotheses addressed in this study were the following:

H_{O1}: There is no relationship between teacher practice of PLC dimensions and a designation of Focus, Highest Progress, or Highest Performing elementary school.

H_{O2}: There is no relationship between teacher level of education and practice of PLC dimensions.

H_{O3}: There is no relationship between teacher practice of PLC dimensions and student achievement in Reading, English Language Arts, or Mathematics.

Summary

This was a research study to gather quantitative data from teachers through a survey to examine their perception of participation in PLCs as it impacts student achievement. Specifically, the study investigated 194 elementary school teachers' implementation of four dimensions of a PLC, moderated by training in PLC principles,

compared to their actual practices of these principles. The study further sought to determine whether student CRCT assessment performance was impacted by the teachers' practice of the identified PLC dimensions in their classrooms.

Research Question 1 asked if implementation of PLC dimensions differed among selected Focus, Highest Progress, and Highest Performing elementary schools. This question was answered using an ANOVA to investigate differences among teachers' implementation of PLC dimensions in their schools. A *post hoc* comparison was further used to evaluate differences among the mean responses of teachers from the three types of schools for the practice of PLC principles.

Research Question 2 asked if a significant relationship existed between teacher level of education and practice of PLC dimensions. This question was answered using a Pearson's Product Moment correlation analysis to explore the strength of the relationship between the two variables.

Research Question 3, which asked if a significant relationship existed between teacher practice of PLC dimensions and student performance on Georgia's CRCT, was answered using a Pearson's Product Moment correlation, as well. Additionally, a partial correlation analysis was used to test if training was a moderating variable. The correlation coefficient, indicating the degree to which the variables were linearly related, was squared (R^2) to determine the amount of variance contributed by each variable.

A summary of the results of the study, illustrated through tables and explained in the interpretation of findings, is presented and merged in Chapter 4. In Chapter 5, conclusions are drawn, and recommendations are made through a discussion of the findings of the study.

Chapter IV

DATA ANALYSIS AND FINDINGS

Introduction

The purpose of this study was to investigate whether teachers in a sample of Georgia's Focus, Highest Progress, and Highest Performing public elementary schools differed in the implementation of four dimensions of a PLC (focus on learning, shared vision, collaborative culture, and supportive structural conditions), how teachers' levels of education impacted their practice of PLC principles, and if their students' academic performances on Georgia's CRCT were impacted by the teachers' practice of the PLC dimensions. Statistical analysis using SPSS was performed to answer the three research questions that guided the study. This chapter presents the major findings of this quantitative study.

Teacher perception data were collected through a survey administered to educators in five elementary schools in a Georgia RESA District. Student achievement data for 3rd, 4th, and 5th grade students in each of the selected schools were collected in the form of grade level averages from the Georgia Governor's Office of Student Achievement Report Card (GOSA, n.d.a). Percentages of students scoring in the *Meets* and *Exceeds* ranges on the Reading, English Language Arts, and Mathematics sections of the CRCT for 2011, 2012, 2013, and 2014 were examined.

Research Questions

Survey data and student achievement data were analyzed to answer the following research questions:

Research Question 1. Does the implementation of PLC dimensions differ among Focus, Highest Progress, and Highest Performing elementary schools?

Research Question 2. Does a significant relationship exist between teacher level of education and practice of PLC dimensions?

Research Question 3. Does a significant relationship exist between teacher practice of PLC dimensions and student performance on the Georgia CRCT?

Data Analysis and Findings

Seven elementary schools within the Georgia RESA District were selected by the GaDOE as Focus, Highest Progress, and Highest Performing based on CRCT data from 2009 to 2013. One of the identified schools served only 6th grade, and one did not have PLCs, so these were eliminated from the study because they did not meet study population parameters. Permission to survey the teachers in the five remaining schools was obtained from the superintendent of each district and the principal of each school.

Data were gathered through self-administered surveys distributed to a total of 194 teachers in faculty meetings in the five identified schools. Based on conversations with the principals, it was established that only teachers who participated in PLCs would complete the surveys. All 194 surveys were returned, resulting in a return rate of 100%. All surveys completed by respondents were utilized to answer the research questions in this study. Of the respondents, 184 (95%) were female, 8 (4%) were male, and 2 (1%) had missing data. Table 5 displays the distribution of respondents by gender.

Table 5

Distribution of Respondents by Gender

Gender	Frequency	Percentage
Male	8	4%
Female	184	95%
Total	192	99%
Missing data	2	1%
Valid N	194	100%

Teachers further provided information regarding their highest level of education. Of the respondents, 57 (29%) reported having a Bachelor's degree, 73 (38%) reported a Master's degree, 54 (28%) reported a Specialist's degree, 5 (2.5%) reported a Doctor of Education degree, none reported a Doctor of Philosophy degree, and 5 (2.5%) had missing data. Table 6 contains the distribution of respondents by level of higher education.

Table 6

Distribution of Respondents by Level of Higher Education

Degree	Frequency	Percentage
Bachelor's degree	57	29%
Master's degree	73	38%
Specialist's degree	54	28%
Doctor of Education	5	2.5%
Doctor of Philosophy	0	0%
Total	189	97.5%
Missing data	5	2.5%
Valid N	194	100%

Survey respondents represented low-, moderate-, and high-performing elementary schools based on their designations by the GaDOE. Seventy-seven (39.69%) of the teachers were from low-performing (Focus) schools, 36 (18.56%) were from moderate performing (Highest Progress) schools, and 81 (41.75%) were from high-performing (Highest Performing) schools. Table 7 displays the distribution of respondents by school performance level.

Table 7

Distribution of Respondents by School Performance Level

Performance Level	Frequency	Percentage
Low-performing	77	39.69%
Moderate-performing	36	18.56%
High-performing	81	41.75%
Valid N	194	100%

Research Question 1: Professional Learning Community Implementation

Does the implementation of PLC dimensions differ among Focus, Highest Progress, and Highest Performing elementary schools?

Research Question 1 was answered using a between-group one-way ANOVA to investigate significant differences among teachers' implementation of PLC dimensions in their schools. Six assumptions were considered prior to running the ANOVA. Assumption one was met by identifying the implementation of PLC dimensions as the dependent variable measured at the continuous level through teacher surveys using a Likert scale.

Assumption two was met by identifying the independent variable of school performance level with three separate, categorical groups: Focus, Highest Progress, and Highest Performing elementary schools, as designated by the GaDOE. Assumption three, independence of observations, was met because there were different participants in each survey group based on the school in which they worked, and each school survey was conducted separately.

When the first three assumptions were met, a one-way ANOVA procedure within SPSS was utilized, entering the implementation of each PLC dimension as the dependent variable and school performance level group (Focus, Highest Progress, and Highest Performing) as the independent variable. The options of descriptive statistics, homogeneity of variance, Welch ANOVA, and means plot were selected, along with Tukey's and Games-Howell *post hoc* tests.

Assumption four was tested by creating and examining boxplots of the data to determine if there were outliers in any groups. This inspection revealed a small number

of outliers in the data, but examination of the individual case numbers in the data file indicated that the outliers were the result of very few participants selecting 1 or 2 on the Likert scale to indicate *Strongly Disagree* or *Disagree* with the level of implementation of the PLC dimensions in only a few cases. To evaluate whether the outliers had an appreciable effect on the analysis, the ANOVA procedure was repeated without the outliers, and then the results were compared. When the results without the outliers were found to be very similar to those of the original analysis, the decision was made to include the outliers, although they violated assumption four.

Assumption five, normality, was met through visual inspection of Normal Q-Q plots because the sample size was greater than 50. This examination revealed that the practice of all PLC dimensions was normally distributed for Focus, Highest Progress, and Highest Performing schools. Descriptive statistics were then examined to find whether there were equal numbers of participants in each group, which groups had higher and lower mean scores, and if the variation in each group was similar.

Presented as mean ± standard deviation, data revealed that peer observation increased from the Focus group (n = 73, 2.8 ± 1.1) to the Highest Progress group (n = 35, 3.6 ± 0.7) and then decreased to the Highest Performing group (n = 75, 2.4 ± 0.9).

Providing feedback to peers related to instructional practices increased from the Focus group (n = 73, 2.9 ± 1.1) to the Highest Progress group (n = 34, 3.5 ± 0.7) and then decreased to the Highest Performing group (n = 75, 2.8 ± 1.1). Collaborative review of student work to improve instructional practice decreased slightly from the Focus group (n = 75, 3.49 ± 1.2) to the Highest Progress group (n = 35, 3.46 ± 1.0) and then increased to the Highest Performing group (n = 77, 3.9 ± 0.7).

Peer coaching increased from the Focus group (n = 70, 2.64 ± 1.2) to the Highest Progress group (n = 34, 2.9 ± 1.1) and then decreased to the Highest Performing group (n = 73, 2.60 ± 1.0). Sharing results of instructional practices decreased from the Focus group (n = 74, 3.7 ± 1.0) to the Highest Progress group (n = 35, 3.6 ± 0.9) and then increased to the Highest Performing group (n = 76, 3.8 ± 0.9).

Working together to assess policies that encourage student learning decreased from the Focus group (n = 72, 3.7 ± 0.9) to the Highest Progress group (n = 35, 3.6 ± 0.9) and then increased to the Highest Performing group (n = 76, 3.8 ± 1.0), as well. Working with colleagues to judge the quality of student work decreased from the Focus group (n = 75, 3.6 ± 1.0) to the Highest Progress group (n = 35, 3.3 ± 0.9) and then increased to the Highest Performing group (n = 78, 4.0 ± 0.7).

Working together to produce instructional materials increased from the Focus group (n = 75, 3.72 ± 0.9) to the Highest Progress group (n = 35, 3.74 ± 0.7) to the Highest Performing group (n = 78, 3.9 ± 0.9). Discussing one another's teaching methods decreased from the Focus group (n = 75, 3.5 ± 1.0) to the Highest Progress group (n = 34, 3.3 ± 0.8) and then increased to the Highest Performing group (n = 76, 3.7 ± 1.1).

Finally, discussing substantive student-centered educational issues increased from the Focus group (n = 74, 3.3 ± 1.1) to the Highest Progress group (n = 35, 3.5 ± 0.8) to the Highest Performing group (n = 75, 3.7 ± 1.0). Descriptive statistics for the implementation of PLC practices survey data are presented in Table 8.

Table 8

Descriptive Statistics for PLC Implementation

PLC Practice	Group	*n*	*M (SD)*
Observe peers	Focus	73	2.8 (1.1)
	Highest Progress	35	3.6 (0.7)
	Highest Performing	75	2.4 (0.9)
Provide feedback to peers related to instructional practices	Focus	73	2.9 (1.1)
	Highest Progress	34	3.5 (0.7)
	Highest Performing	75	2.8 (1.1)
Collaboratively review student work to improve instructional practice	Focus	75	3.49 (1.2)
	Highest Progress	35	3.46 (1.0)
	Highest Performing	77	3.9 (0.7)
Peer coach	Focus	70	2.64 (1.2)
	Highest Progress	34	2.9 (1.1)
	Highest Performing	73	2.60 (1.0)
Share the results of instructional practices	Focus	74	3.7 (1.0)
	Highest Progress	35	3.6 (0.9)
	Highest Performing	76	3.8 (0.9)
Work together to assess policies that encourage student learning	Focus	72	3.7 (0.9)
	Highest Progress	35	3.6 (0.9)
	Highest Performing	76	3.8 (1.0)
Work with colleagues to judge the quality of student work	Focus	75	3.6 (1.0)
	Highest Progress	35	3.3 (0.9)
	Highest Performing	78	4.0 (0.7)
Work together to produce instructional materials	Focus	75	3.72 (0.9)
	Highest Progress	35	3.74 (0.7)
	Highest Performing	78	3.9 (0.9)
Discuss one another's teaching methods	Focus	75	3.5 (1.0)
	Highest Progress	34	3.3 (0.8)
	Highest Performing	76	3.7 (1.1)
Discuss substantive student-centered educational issues	Focus	74	3.3 (1.1)
	Highest Progress	35	3.5 (0.8)
	Highest Performing	75	3.7 (1.0)

Assumption six, homogeneity of variances, was assessed using Levene's test. Examination of resulting *p*-values indicated homogeneity of variance for eight of the ten PLC practices, but the assumption was violated for the remaining two practices. Equal variances were identified for the PLC practices of observing peers ($p = .054$), providing feedback related to instructional practices ($p = .053$), peer coaching ($p = .064$), sharing results of instructional practices ($p = .208$), working together to assess policies that encourage student learning ($p = .774$), working together to produce instructional materials ($p = .359$), discussing one another's teaching methods ($p = .213$), and discussing substantive student-centered educational issues ($p = .363$).

However, unequal variances were identified for collaboratively reviewing student work to improve instructional practice ($p < .0005$) and working with colleagues to judge the quality of student work ($p = .002$). Population variances for PLC practices are presented in Table 9.

Table 9

Population Variances for PLC Practices

PLC Practice	*p*
Observe peers	.054
Provide feedback to peers related to instructional practices	.053
Collaboratively review student work to improve instructional practice	< .0005
Peer coach	.064
Share the results of instructional practices	.208
Work together to assess policies that encourage student learning	.774
Work with colleagues to judge the quality of student work	.002
Work together to produce instructional materials	.359
Discuss one another's teaching methods	.213
Discuss substantive student-centered educational issues	.363

Because Levene's test of homogeneity of variances indicated unequal population variances for collaboratively reviewing student work and judging the quality of student work, the Welch ANOVA was used to reduce the chance of a false positive correlation. The groups' means were compared using the unequal variance F-test and found to be significantly different. Collaboratively reviewing student work to improve instructional practice was found to be statistically significant, indicating a difference in school performance level, Welch's F (2, 87.609) = 5.040, p = .008. Similarly, working with colleagues to judge the quality of student work was statistically significant, indicating a

difference in school performance level, Welch's F (2, 89.934) = 10.945, $p < .0005$. Welch ANOVA results are presented in Table 10.

Table 10

Results of Welch ANOVA for PLC Practices

PLC Practice	df_1	df_2	F-value	p-value
Collaboratively review student work	2	87.609	5.040	.008
Judge quality of student work with colleagues	2	89.934	10.945	< .0005

Presented as mean ± standard deviation, data from Games-Howell *post hoc* analysis revealed an increase in collaboratively reviewing student work to improve instructional practice from 3.46 ± 1.0 in the Highest Progress group to 3.91 ± 0.7 in the Highest Performing group, an increase of 0.45 (95% CI, 0.31 to 1.17), which was statistically significant ($p < .0005$). Likewise, there was an increase in working with colleagues to judge the quality of student work from 3.34 ± 0.9 in the Highest Progress group to 4.04 ± 0.7 in the Highest Performing group, an increase of 0.70 (95% CI, 0.29 to 1.10), which was statistically significant ($p < .0005$). Games-Howell *post hoc* analysis results are presented in Table 11.

Table 11

Games-Howell Post Hoc Results for PLC Practices by Performance Group

Dependent Variable	Performance Level	Performance Level	Mean Difference	Standard Error	*p*-value
Collaboratively review student work	Focus	H. Progress	.036	.213	.984
		H. Performing	-.416	.164	.033
	H. Progress	Focus	-.036	.213	.984
		H. Performing	-.452	.182	.042
	H. Performing	Focus	.416	.164	.033
		H. Progress	.452	.182	.042
Judge quality of student work with colleagues	Focus	H. Progress	.217	.185	.471
		H. Performing	-.478	.140	.002
	H. Progress	Focus	-.217	.185	.471
		H. Performing	-.696	.170	< .0005
	H. Performing	Focus	.478	.140	.002
		H. Progress	.696	.170	< .0005

For the eight variances that were equal, the standard one-way ANOVA was interpreted. When the differences were statistically significant, Tukey's *post hoc* results were utilized to pinpoint exactly where differences were found between groups.

Peer coaching increased from the Focus group (2.64 ± 1.2) to the Highest Progress group (2.9 ± 1.1) and then decreased to the Highest Performing group (2.60 ± 1.0), but the differences between these groups were not statistically significant, F (2, 174) = 1.130, p = .326. Sharing results of instructional practices further decreased from the Focus group (3.7 ± 1.0) to the Highest Progress group (3.6 ± 0.9) and then increased to the Highest Performing group (3.8 ± 0.9), but the differences were not statistically significant, F (2, 182) = 1.085, p = .340.

Similarly, working together to assess policies that encourage student learning decreased from the Focus group (3.7 ± 0.9) to the Highest Progress group (3.6 ± 0.9) and

then increased to the Highest Performing group (3.8 ± 1.0), but the differences were not statistically significant, F (2, 180) = 1.060, p = .349. Working together to produce instructional materials increased from the Focus group (3.72 ± 0.9) to the Highest Progress group (3.74 ± 0.7) to the Highest Performing group (3.9 ± 0.9), but the differences were not statistically significant, F (2, 185) = 1.316, p = .271.

Discussing one another's teaching methods decreased from the Focus group (3.5 ± 1.0) to the Highest Progress group (3.3 ± 0.8) and then increased to the Highest Performing group (3.7 ± 1.1), but the differences were not statistically significant, F (2, 182) = 1.444, p = .239. Finally, discussing substantive student-centered educational issues increased from the Focus group (3.3 ± 1.1) to the Highest Progress group (3.5 ± 0.8) to the Highest Performing group (3.7 ± 1.0), but the differences between the performance level groups were not statistically significant, F (2, 181) = 2.371, p = .096.

However, the practice of observing peers was statistically significant, indicating a difference in level of school performance, F (2, 180) = 21.348, p < .0005. Observation of peers increased from the Focus group (2.8 ± 1.1) to the Highest Progress group (3.6 ± 0.7) and then decreased to the Highest Performing group (2.4 ± 0.9). Providing feedback to peers related to instructional practices was statistically significant, indicating a difference in level of school performance, F (2, 179) = 6.027, p = .003. Providing feedback related to instructional practices increased from the Focus group (2.9 ± 1.1) to the Highest Progress group (3.5 ± 0.7) and then decreased to the Highest Performing group (2.8 ± 1.1). One-way ANOVA results are presented in Table 12.

Table 12

Results of One-way ANOVA for PLC Practices

PLC Practice	df_1	df_2	*F*-value	*p*-value
Peer coaching	2	174	1.130	.326
Sharing results of instructional practices	2	182	1.085	.340
Working together to assess policies	2	180	1.060	.349
Working together to produce instructional materials	2	185	1.316	.271
Discussing one another's teaching methods	2	182	1.444	.239
Discussing student-centered educational issues	2	181	2.371	.096
Observing peers	2	180	21.348	< .0005
Providing feedback to peers related to instr. practices	2	179	6.072	.003

Tukey's *post hoc* analysis for the practice of observing peers revealed that the increase from Focus to Highest Progress (0.83, 95% CI [0.38 to 1.28]) was statistically significant ($p < .0005$). Tukey's *post hoc* analysis for the practice of providing feedback to peers related to instructional practices indicated that the increase from Focus to Highest Progress (0.58, 95% CI [0.07 to 1.09]) was statistically significant ($p = .021$), as well. Tukey's *post hoc* analysis results are presented in Table 13.

Table 13

Tukey's Post Hoc Results for PLC Practices by Performance Group

Dependent Variable	Performance Level	Performance Level	Mean Difference	Standard Error	*p*-value
Observing peers	Focus	H. Progress	-.833	.191	< .0005
		H. Performing	.407	.152	< .0005
	H. Progress	Focus	.833	.191	< .0005
		H. Performing	1.240	.190	< .0005
	H. Performing	Focus	-.407	.152	.022
		H. Progress	-1.240	.190	< .0005
Providing feedback to peers related to instructional practices	Focus	H. Progress	-.582	.216	.021
		H. Performing	.158	.171	.627
	H. Progress	Focus	.582	.216	.021
		H. Performing	.740	.215	.002
	H. Performing	Focus	-.158	.171	.627
		H. Progress	-.740	.215	.002

Four of the ten group means analyzed were statistically significant, indicating a difference ($p < .05$), but six were not; therefore, we fail to reject the null hypothesis H_{O1}: There is no relationship between teacher practice of PLC dimensions and a designation of Focus, Highest Progress, or Highest Performing elementary school.

Research Question 2: Teacher Education and PLC Practice

Does a significant relationship exist between teacher level of education and practice of PLC dimensions?

Research Question 2 was answered using a Pearson's Product Moment correlation analysis. Four assumptions were met prior to running the Pearson's correlation. Assumption one was met by identifying two continuous variables. Both the independent variable, teacher level of education, measured through demographic data indicating

highest degree earned, and the dependent variable, practice of PLC dimensions, measured using a Likert scale, were measured at the continuous level.

Assumption two, linearity, and assumption three, outliers, were met by visually inspecting scatterplots created within SPSS. This inspection revealed that the relationship between teacher level of education and the practice of each PLC dimension was linear with no significant outliers in the data.

Assumption four, normality, was met by testing teacher level of education and practice of PLC dimensions using SPSS. Because the sample size was greater than 50, Normal Q-Q plots were visually inspected. The practice of all PLC dimensions was found to be normally distributed for all levels of teacher education.

When all preliminary analyses revealed that none of the underlying assumptions had been violated, Pearson's Product Moment correlation procedures were performed within SPSS. The resulting correlations tables were used to find Pearson's correlation coefficients (r), as well as significance levels (p-values) to determine the strength of the relationship between teacher level of education and the actual practice of the various PLC dimensions.

Teachers' levels of education, Bachelor's (n = 57), Master's (n = 73), Specialist's (n = 54), Doctor of Education (n = 5), and Doctor of Philosophy (n = 0) degrees, were compared to teachers' reported practice of the dimensions of PLCs included in the survey instrument. These practices included observing peers, providing feedback to peers related to instructional practices, collaboratively reviewing student work to improve instructional practice, peer coaching, sharing results of instructional practices, working together to assess policies that encourage student learning, working with colleagues to

judge the quality of student work, working together to produce instructional materials, discussing one another's teaching methods, and discussing substantive student-centered educational issues.

Correlations matrices indicated small positive correlations between teacher education level and observing peers, $r = .164$, providing feedback to peers related to instructional practices, $r = .165$, sharing results of instructional practices, $r = .037$, working together to assess policies that encourage student learning, $r = .037$, working together to produce instructional materials, $r = .094$, discussing one another's teaching methods, $r = .081$, and discussing substantive student-centered educational issues, $r = .108$.

Small negative correlations were identified between teacher education level and collaboratively reviewing student work to improve instructional practice, $r = -.010$, peer coaching, $r = -.002$, and working with colleagues to judge the quality of student work, $r = -.008$. Inferential statistics for the correlation of teacher level of education and practice of PLC dimensions are presented in Table 14.

Table 14

Pearson's Correlations for Education Levels and PLC Practices

PLC Practice Related to Teacher Level of Education	Coefficient Value $\|r\|$	Significance Level (p-value)	Coefficient of Determination R^2
Observe peers	.164	.028	.027
Provide feedback on instructional practices	.165	.027	.027
Collaboratively review student work	.010	.888	.0001
Peer coach	.002	.974	.000004
Share results of instructional practices	.037	.617	.001
Work together to assess policies	.037	.623	.001
Work with colleagues to judge student work	.008	.919	.00006
Work together to produce materials	.094	.203	.009
Discuss teaching methods	.081	.275	.007
Discuss student-centered issues	.108	.149	.012

An examination of the levels of statistical significance (p-values) in Table 14 revealed a small statistically significant positive correlation between teachers' levels of education and observing peers, $r(178) = .164$, $p = .028$, as well as between teachers' levels of education and providing feedback to peers related to instructional practices, $r(178) = .165$, $p = .027$. However, there were no statistically significant correlations ($p < .05$) between teachers' levels of education and eight of the ten PLC dimensions analyzed;

therefore, we fail to reject the null hypothesis H_{O2}: There is no relationship between teacher level of education and practice of PLC dimensions.

Research Question 3: Teacher Practice and Student Performance

Does a significant relationship exist between teacher practice of PLC dimensions and student performance on the Georgia CRCT?

Similarly, Research Question 3 was answered using a Pearson's Product Moment correlation analysis to explore the strength of the relationship between teacher practice of PLC dimensions and student performance on Georgia's CRCT within the elementary schools selected for this study. Assumption one was met for this question as both the independent variable of teacher practice of PLC dimensions, measured using a Likert scale, and the dependent variable of student performance on CRCT, measured by the GaDOE school designation as Focus, Highest Progress, or Highest Performing, were measured at the continuous level.

Assumption two, linearity, and assumption three, outliers, were met by creating scatterplots within SPSS. Visual inspection of the scatterplot results revealed that the relationship between teacher practice of PLC dimensions and student performance on CRCT was linear, and the scatterplots indicated no significant outliers in the data.

Assumption four, normality, was met by testing teacher practice of PLC dimensions and student performance on CRCT as measured by school designation as Focus, Highest Progress, and Highest Performing. Because the sample size was greater than 50, Normal Q-Q plots created through SPSS were visually inspected. The practice of all PLC dimensions was found to be normally distributed for all school designation levels, so assumption four was met.

When all preliminary analyses revealed that none of the underlying assumptions had been violated, Pearson's Product Moment correlation procedures were performed within SPSS to explore the relationship between the two variables. The resulting correlations tables were used to find Pearson's correlation coefficients (*r*) and significance levels (*p*-values) to determine the strength of the relationship between teacher practice of the PLC dimensions and student performance on the Georgia CRCT as indicated by each schools' designations as Focus, Highest Progress, and Highest Performing.

Correlations matrices indicated small positive correlations between student CRCT performance as indicated by school designation and collaboratively reviewing student work, $r = .186$, sharing results of instructional practices, $r = .068$, working together to assess policies related to student learning, $r = .053$, working with colleagues to judge the quality of student work, $r = .242$, working together to produce instructional materials, $r = .112$, discussing teaching methods, $r = .085$, and discussing substantive student-centered educational issues, $r = .159$.

Small negative correlations were identified between student performance and observing peers, $r = -.181$, providing feedback on instructional practices, $r = -.068$, and peer coaching, $r = -.017$. The correlation coefficients, indicating the degree to which the variables were linearly related, were squared (R^2) to determine the amount of variance contributed by each variable. Inferential statistics for the correlation of practice of PLC dimensions and student performance on the CRCT as indicated by each school's designation as a Focus, Highest Progress, or Highest Performing elementary school are presented in Table 15.

Table 15

Pearson's Correlations for PLC Practices and Student Performance

PLC Practice Related to Student Performance	Coefficient Value $\|r\|$	Significance Level (p-value)	Coefficient of Determination R^2
Observe peers	.181	.014	.033
Provide feedback on instructional practices	.068	.361	.005
Collaboratively review student work	.186	.011	.035
Peer coach	.017	.821	.0003
Share results of instructional practices	.068	.358	.005
Work together to assess policies	.053	.474	.003
Work with colleagues to judge student work	.242	.001	.059
Work together to produce materials	.112	.125	.013
Discuss teaching methods	.085	.247	.007
Discuss student-centered issues	.159	.031	.025

An examination of the levels of statistical significance (p-values) in Table 15 revealed a small statistically significant positive correlation between student performance on Georgia's CRCT and collaboratively reviewing student work, $r(185) = .186$, $p = .011$, between student performance and working with colleagues to judge the quality of student work, $r(186) = .242$, $p = .001$, as well as between student performance and discussing substantive student-centered educational issues, $r(182) = .159$, $p = .031$. A small

statistically significant negative correlation was found between student performance and observing peers, $r(181) = -.181$, $p = .014$.

As an extension of Pearson's correlation, partial correlation analysis was used to test if teacher training in PLC dimensions was a moderating variable on the statistically significant relationships between teacher practice of PLC dimensions and student achievement as indicated by school level of performance. The first-order correlation coefficients indicated how much of the variance was unique to the independent and dependent variables. When controlling for training on the relationship between collaboratively reviewing student work and student achievement, the first-order correlation was found to be statistically insignificant, $r(168) = .117$, $p = .127$.

Conversely, controlling for training on the relationship between working with colleagues to judge the quality of student work and student achievement revealed that the first-order correlation was statistically significant, $r(164) = .205$, $p = .008$. Controlling for training on the relationship between discussing substantive student-centered educational issues and student achievement further proved to be statistically significant, $r(160) = .168$, $p = .032$. Finally, controlling for training on the relationship between observing peers and student achievement revealed a small statistically significant negative correlation, $r(165) = -.182$, $p = .018$.

In these statistical procedures, the correlation coefficients indicated the degree to which the variables were linearly related. The correlation coefficients were squared (R^2) to determine the amount of variance contributed by each variable. Inferential statistics for the correlation of PLC practice and student performance on the CRCT as indicated by

designation as a Focus, Highest Progress, or Highest Performing school, moderated by teacher training in the PLC dimensions, are presented in Table 16.

Table 16

Pearson's Correlations for PLC Practices and Student Performance, Moderated by Teacher Training

PLC Practice Related to Student Performance	Coefficient Value $\|r\|$	Significance Level (p-value)	Coefficient of Determination R^2
Observe peers	.182	.018	.033
Collaboratively review student work	.117	.127	.014
Work with colleagues to judge student work	.205	.008	.042
Discuss student-centered issues	.168	.032	.028

As Table 16 illustrates through the coefficients of determination, the practice of observing peers accounted for 3% of the variance in student performance when controlling for teacher training in the PLC practices. Similarly, working with colleagues to judge the quality of student work accounted for 4% of the variance, and discussing substantive student-centered educational issues accounted for 3% of the variance. However, because there were no statistically significant correlations ($p < .05$) between student performance on Georgia's CRCT as indicated by each school's designation as a Focus, Highest Progress, or Highest Performing elementary school and seven of the ten PLC dimensions analyzed, we fail to reject the null hypothesis H_{O3}: There is no relationship between teacher practice of PLC dimensions and student achievement in Reading, English Language Arts, or Mathematics.

Summary

Research Question 1 sought to determine if implementation of PLC dimensions differed among the Focus, Highest Progress, and Highest Performing elementary schools which were studied. Results of ANOVA and *post hoc* comparisons indicated statistically significant differences among teachers' implementation in four of ten PLC dimensions investigated.

Collaboratively reviewing student work to improve instructional practice was found to be statistically significant, indicating a difference in school performance level, Welch's F (2, 87.609) = 5.040, p = .008. Games-Howell *post hoc* analysis revealed an increase from 3.46 ± 1.0 in the Highest Progress group to 3.91 ± 0.7 in the Highest Performing group, an increase of 0.45 (95% CI, 0.31 to 1.17), which was statistically significant ($p < .0005$).

Similarly, working with colleagues to judge the quality of student work was statistically significant, indicating a difference in school performance level, Welch's F (2, 89.934) = 10.945, $p < .0005$. Games-Howell *post hoc* analysis revealed an increase from 3.34 ± 0.9 in the Highest Progress group to 4.04 ± 0.7 in the Highest Performing group, an increase of 0.70 (95% CI, 0.29 to 1.10), which was statistically significant ($p < .0005$).

The practice of observing peers was found to be statistically significant, as well, indicating a difference in level of school performance, F (2, 180) = 21.348, $p < .0005$. Observation of peers increased from the Focus group (2.8 ± 1.1) to the Highest Progress group (3.6 ± 0.7). Tukey's *post hoc* analysis revealed that the increase (0.83, 95% CI [0.38 to 1.28]) was statistically significant ($p < .0005$).

Finally, providing feedback to peers related to instructional practices was statistically significant, indicating a difference in level of school performance, F (2, 179) = 6.027, p = .003. Data revealed that this PLC practice increased from the Focus group (2.9 ± 1.1) to the Highest Progress group (3.5 ± 0.7). Tukey's *post hoc* analysis indicated that the increase (0.58, 95% CI [0.07 to 1.09]) was statistically significant (p = .021).

Research Question 2 asked if a significant relationship existed between teacher level of education and practice of PLC dimensions. A Pearson's Product Moment correlation analysis indicated a small statistically significant positive correlation between teachers' levels of education and two of the ten PLC dimensions studied.

Correlations matrices indicated small positive correlations between teacher education level and the PLC practices of observing peers, r = .164, providing feedback to peers related to instructional practices, r = .165, sharing results of instructional practices, r = .037, working together to assess policies that encourage student learning, r = .037, working together to produce instructional materials, r = .094, discussing one another's teaching methods, r = .081, and discussing substantive student-centered educational issues, r = .108.

Further examination of the levels of statistical significance (p-values) revealed a small statistically significant positive correlation between teachers' levels of education and observing peers, $r(178)$ = .164, p = .028, as well as between teachers' levels of education and providing feedback to peers related to instructional practices, $r(178)$ = .165, p = .027.

Research Question 3 sought to determine if a significant relationship existed between teacher practice of PLC dimensions and student performance on the Georgia

CRCT. A Pearson's Product Moment correlation and a partial correlation analysis revealed a small statistically significant correlation between the practice of PLC dimensions and student achievement on CRCT as measured by each school's designation as a Focus, Highest Progress, or Highest Performing elementary school in three of the ten PLC dimensions studied.

Correlations matrices indicated small positive correlations between student CRCT performance as indicated by school designation and collaboratively reviewing student work, $r = .186$, sharing results of instructional practices, $r = .068$, working together to assess policies related to student learning, $r = .053$, working with colleagues to judge the quality of student work, $r = .242$, working together to produce instructional materials, $r = .112$, discussing teaching methods, $r = .085$, and discussing substantive student-centered educational issues, $r = .159$. Small negative correlations were identified between student performance and observing peers, $r = -.181$, providing feedback on instructional practices, $r = -.068$, and peer coaching, $r = -.017$.

An examination of the levels of statistical significance (p-values) revealed a small statistically significant positive correlation between student performance on the CRCT and collaboratively reviewing student work, $r(185) = .186$, $p = .011$, working with colleagues to judge the quality of student work, $r(186) = .242$, $p = .001$, and discussing substantive student-centered educational issues, $r(182) = .159$, $p = .031$. A small statistically significant negative correlation was found between student performance and observing peers, $r(181) = -.181$, $p = .014$.

A partial correlation analysis controlling for training on the relationship between working with colleagues to judge the quality of student work and student achievement

indicated that the first-order correlation was statistically significant, $r(164) = .205$, $p = .008$. Controlling for training on the relationship between discussing substantive student-centered educational issues and student achievement further proved to be statistically significant, $r(160) = .168$, $p = .032$, and controlling for training on the relationship between observing peers and student achievement revealed a small statistically significant negative correlation, $r(165) = -.182$, $p = .018$.

Analysis of the coefficients of determination indicated the practice of observing peers accounted for 3% of the variance in student performance when controlling for teacher training in the PLC practices. Working with colleagues to judge the quality of student work accounted for 4% of the variance, and discussing substantive student-centered educational issues accounted for 3% of the variance.

Chapter 5 presents a summary of this study along with conclusions drawn from the research. Recommendations for action and future study are made through a discussion of the findings of this work.

Chapter V

SUMMARY AND DISCUSSION

This chapter contains a summary of the study and discussion of the findings. The summary includes a review of the study's purpose, a synopsis of the related literature, and an overview of the study's research design, limitations, and data analysis. Discussion of the findings includes conclusions drawn from the research, recommendations for action among those interested in PLCs, and recommendations for future study concerning this topic.

The introduction of student learning standards and increased levels of academic expectations created a need for educators to become more intentional in their study of teaching strategies (Hord, 2008). To meet this need, communities of teachers began to work together to improve teaching and learning by examining assessment data from multiple sources and pinpointing strengths and weaknesses within their students' learning. From these findings, educators began to consider which skills and strategies they must acquire in order to more effectively teach what their students needed to learn (Hord, 2008).

Purpose of the Study

The PLC process has been cited by researchers and professional organizations as having great potential to impact student achievement in a positive manner (DuFour & Eaker, 1998; DuFour & Marzano, 2011; Farkas, 2003; Jackl & Lougée, 2012). As the current era of high-stakes accountability has left many teachers struggling to improve the

quality of teaching and learning, PLCs have been recommended to foster collaboration and to make teacher practices public (Wood, 2007). Therefore, the purpose of this study was to examine whether elementary level teachers in a sampling of Georgia's Focus, Highest Progress, and Highest Performing schools differed in the implementation of PLC dimensions, how their education level compared to their practice of PLC principles, and if their practice of the principles had an effect on student academic performance. The study was guided by three research questions.

Research Question 1. Does the implementation of PLC dimensions differ among Focus, Highest Progress, and Highest Performing elementary schools?

Research Question 2. Does a significant relationship exist between teacher level of education and practice of PLC dimensions?

Research Question 3. Does a significant relationship exist between teacher practice of PLC dimensions and student performance on the Georgia CRCT?

Related Literature

According to R. P. DuFour and R. B. DuFour (n.d.), researchers began to write about the term PLC in the 1960s as an alternative to the inherently isolated nature of the teaching profession in the United States. Hord (2008) concurred that teachers throughout history worked mainly in isolation, closing their classroom doors and teaching from their knowledge of curriculum and instruction. This state of isolation began to disappear in the 1980s as educators started to teach in open classrooms and collaborative teams (R. P. DuFour & R. B. DuFour, n.d.; Hord, 2008). As this shift led to the removal of physical barriers and isolation, educators began to come together to share their work, resulting in significant improvement in motivation and morale (Hord, 2008).

As team teaching and collaborating on instructional strategies and programs grew from teachers' meetings, school districts began to see the value in teacher collaboration. Some teacher learning resulted from this type of collaboration, so many educators thought of working collaboratively as the main focus of PLCs (Hord, 2008). However, DuFour and DuFour (n.d.) insisted that, to become a true PLC, the focus of the relevant question had to shift from teachers' *teaching* of content to the students' *learning* of content.

With the introduction of student learning standards, teachers and administrators discovered a need to become more intentional in their study of strategies to enable learners to reach increased levels of expectations (Hord, 2008). As a result, communities of professional educators began to develop for the purpose of improving learning. These early PLCs examined assessment data from multiple sources to pinpoint areas of strength and weakness in student learning. From these findings, educators began the work of determining what they must learn in order to become more effective teachers for their students (Hord, 2008).

Researchers with AISR (2004) described PLCs as "groups of educators… and other stakeholders who collectively examine and improve their own professional practice" (p. 2). These small groups met regularly; focused on data, standards, instruction, and results; expanded participants' knowledge; and encouraged innovation and excellence. Striving for continual growth, PLC participants desired to change the nature of their schools by encouraging the evolution of teaching and learning (AISR, 2004).

Similarly, Pirtle and Tobia (2014) found that where teachers felt encouraged by their leaders, they supported one another's practice in PLCs, felt more confident in themselves, developed a stronger sense of self-efficacy, and believed in their ability to influence student learning and achievement. As a result, teachers were more committed to their collaborative work to meet students' individual learning needs.

In a review of research examining the impact PLCs have on teachers and students, Vescio et al. (2008) reviewed 10 empirical studies of teacher collaboration in learning communities within the United States and one large multi-site research report published in England. All of these studies reported data documenting the impact of PLCs on teaching practice and/or student learning. The authors examined what the studies conveyed about how educators changed their teaching practices and found that PLC participants' practices became more student-centered over time. Some teachers increased flexibility in their classroom arrangements, some varied their lesson pacing to meet the needs of learners, and others improved classroom pedagogy to use higher order thinking strategies. The researchers found all 11 studies cited data supporting fundamental shifts in the schools' professional cultures and the habits of mind teachers brought to their classrooms, as well (Vescio et al., 2008).

Vescio et al. (2008) noted that the most successful PLCs shared four common characteristics: the teachers participated in open collaboration, the groups focused on student learning, the participants exercised some authority over their own learning and various aspects of school governance, and the members participated in continuous teacher learning to accomplish their goals. The researchers found that eight of the 11 studies examined the connection between PLC participation and student achievement and

documented improvement in test scores and other measures of student achievement. The researchers concluded that student achievement increased most where PLCs were highly involved and teachers focused persistently on student learning and achievement data.

Another large study was conducted by North Carolina's Wake County Public School System (WCPSS). WCPSS implemented PLCs in 2003 in an effort to improve graduation rates and better prepare students for post-secondary education and the workforce (Jackl & Lougée, 2012). In 2006-2007, PLC implementation became a key strategy for achieving the district mission, and evaluation specialists began to collect data to determine the impact on teachers and student achievement.

Jackl and Lougée (2012) reported that more than 80% of WCPSS teachers agreed or strongly agreed that their work in PLCs positively impacted their teaching performance and their students' academic achievement. WCPSS schools with high-performing PLCs had lower percentages of failing grades, and those with high-performing PLCs had markedly lower rates of student retention. Finally, statistical analyses of the relationship between high-performing PLC indices and student end-of-grade and end-of-course assessment data indicated that student performance improved over time.

To investigate a possible link between PLCs and student achievement, Passi (2010) surveyed 365 ELA teachers in three suburban New York high schools concerning their PLC practices and examined their students' 3-year average mastery rates on the New York State ELA Regents Exam. The researcher found that teachers from high-performing schools expressed a higher focus on learning, a greater agreement with a shared vision, higher rates of peer collaboration, and increased levels of supportive

structures in their schools when compared with teachers from low- and moderate-performing schools. Furthermore, Passi's (2010) findings indicated that all four of the PLC dimensions studied were related to student achievement.

Methods

This quantitative study examined the relationship between teachers' training in PLC principles and their practice of PLC principles, as well as whether student performance was impacted by the practice of the PLC dimensions. Survey data were collected to examine teachers' perceptions of the existence of the four dimensions of a PLC (focus on learning, shared vision, collaborative culture, and supportive conditions) within their schools.

Participants. The population for this study was elementary schools in a Georgia RESA District. Seven elementary schools from the RESA district were selected as Focus, Highest Progress, and Highest Performing schools. These Georgia public schools were identified as low-performing, progressing, or high-performing by the GaDOE based on CRCT data from 2009 to 2013. One of the identified schools served only 6th grade, and one did not have PLCs, so these schools were eliminated from the study because they did not meet study population parameters. The remaining five identified schools served as the sample for this study.

Schools A and B were classified as Highest Performing Schools by the GaDOE, so they were among the 5% of Georgia Title I schools with the highest performance for the "All Students" group ($n \geq 30$) over 3 years, and they made Adequate Yearly Progress in 2011. School C was classified as a Highest Progress School, so it was among the 10% of Georgia Title I schools with the highest progress in performance for the "All Students"

group ($n \geq 30$) over 3 years. Schools D and E were classified as Focus Schools, so they were among the Georgia Title I schools with the largest within-school gaps between the highest-achieving subgroups and the lowest-achieving subgroups (GaDOE, 2012).

All teachers involved in PLCs within the five schools were given the opportunity to participate in the study. A total of 194 teachers completed the self-administered surveys; all 194 surveys were returned, resulting in a return rate of 100%. Of the respondents, 184 (95%) were female, 8 (4%) were male, and 2 (1%) had missing data. When asked their level of higher education, 57 (29%) reported having a Bachelor's degree, 73 (38%) reported a Master's degree, 54 (28%) reported a Specialist's degree, 5 (2.5%) reported a Doctor of Education degree, none reported a Doctor of Philosophy degree, and 5 (2.5%) had missing data. Permission was obtained from the superintendent of each district and the principal of each school prior to the distribution of the survey instrument.

Survey Instrument. The instrument utilized, based on the survey used in Passi's (2010) study, consisted of 40 statements concerning the four dimensions of PLCs, as well as 10 additional statements to rate the level to which teachers had been trained in the various PLC dimensions and the level to which these dimensions were being practiced in their schools. Participants were asked to read each statement and indicate their personal degree of agreement with each statement based on a 5-point Likert scale from 1 (S*trongly Disagree*) to 5 (S*trongly Agree*).

Procedures and Data Analysis. A completed application for the use of human participants in research was submitted to the Valdosta State University Institutional

Review Board (IRB) in January 2015. After reviewing the application packet, the Review Board determined the research protocol to be exempt from IRB oversight.

A face-to-face meeting was scheduled with each school's faculty during February and March of 2015 to ask teachers to take part in the survey. No compensation was employed to recruit participants. Completion of the survey served as each teacher's voluntary agreement to participate in this research project and certification that he or she was 18 or older.

To protect participants' privacy, the nature of the project was explained, and then the teachers were given the opportunity to complete the self-administered surveys on their own. Participants were asked to place their surveys in a manila envelope as they exited the room. No personally identifiable information (name of the respondent, school affiliation, etc.) was collected through the use of the survey.

To maintain participants' anonymity, survey responses were input into an electronic database, and the original survey forms were placed into a locked file cabinet to be retained for a period of 3 years. All electronic data were kept confidential and stored on a password protected computer. Only those involved in the research project had access to the data.

Student achievement data for 3rd, 4th, and 5th grade students in each of the selected Focus, Highest Progress, and Highest Performing schools were collected in the form of grade level averages from the Georgia Governor's Office of Student Achievement (GOSA) Report Card (GOSA, n.d.a). Percentages of students scoring in the *Meets* and *Exceeds* ranges on the Reading, English Language Arts, and Mathematics sections of the CRCT from 2011 through 2014 were examined.

Limitations

The schools involved in this study were not randomly selected; they were purposively selected based on their designation as a Focus, Highest Progress, or Highest Performing elementary school in the RESA District. Similarly, only elementary level teachers in rural Georgia were included, so the results may not be generalizable to other grade ranges or demographic areas of the country. The absence of classroom observational data to validate teachers' self-reported survey responses further limited the generalizability of the study.

Varying levels of training in PLC practices, years of classroom experience, or length of tenure in a current position could have impacted teachers' responses and limited the extent to which conclusions might apply to all public schools in general. Additionally, self-reported data gathered through the use of the survey instrument may have been adversely influenced by participants' negative feelings toward required PLC meetings during or after the school day (Woodland & Mazur, 2015). Furthermore, teachers were only surveyed one time for this study; an annual follow-up survey would improve the validity of the measure of implementation of PLC principles (Pallant, 2005).

Results

Research Question 1 sought to determine if implementation of PLC dimensions differed among the Focus, Highest Progress, and Highest Performing elementary schools which were selected for the study. Results of ANOVA and *post hoc* comparisons indicated statistically significant differences among teachers' implementation in four of ten PLC dimensions investigated.

Collaboratively reviewing student work to improve instructional practice was found to be statistically significant, indicating a difference in school performance level, Welch's F (2, 87.609) = 5.040, p = .008. Games-Howell *post hoc* analysis revealed an increase from 3.46 ± 1.0 in the Highest Progress group to 3.91 ± 0.7 in the Highest Performing group, an increase of 0.45 (95% CI, 0.31 to 1.17), which was statistically significant ($p < .0005$).

Wood (2007) found that PLC participants reported having more collegial conversations and receiving more feedback focused on student work samples and classroom practices after participation in PLCs compared to before PLC implementation. The current study of PLC dimensions confirms that these practices can improve teacher instruction and school performance levels, as well.

Similarly, working with colleagues to judge the quality of student work was statistically significant, indicating a difference in school performance level, Welch's F (2, 89.934) = 10.945, $p < .0005$. Games-Howell *post hoc* analysis revealed an increase from 3.34 ± 0.9 in the Highest Progress group to 4.04 ± 0.7 in the Highest Performing group, an increase of 0.70 (95% CI, 0.29 to 1.10), which was statistically significant ($p < .0005$).

Koenigsberger (2015) reported that PLC members must develop authentic learning tasks for students and study the effects of teaching critical thinking skills. The researcher stated that high-performing PLCs must eliminate unnecessary material to make room for pertinent new material. To prepare students for a competitive world beyond schooling, PLC members must present problems in novel situations and ensure that assessments encompass essential knowledge and higher-order thinking skills.

Results of the current study further demonstrate the importance of working with colleagues to ensure an appropriate level of rigor and quality of student work.

The practice of observing peers was found to be statistically significant, as well, indicating a difference in level of school performance, F (2, 180) = 21.348, $p < .0005$. Observation of peers increased from the Focus group (2.8 ± 1.1) to the Highest Progress group (3.6 ± 0.7). Tukey's *post hoc* analysis revealed that the increase (0.83, 95% CI [0.38 to 1.28]) was statistically significant ($p < .0005$).

Lieberman and Miller (2011) suggested that successful PLC members should build open, trusting relationships among all participants and focus collectively on problems of practice. The researchers further encouraged PLC participants to create routines and rituals to support honest discussion and disclosure, including observation, problem solving, and peer teaching and learning activities. The current PLC study demonstrates further support for the practice of peer observation.

Finally, providing feedback to peers related to instructional practices was statistically significant, indicating a difference in level of school performance, F (2, 179) = 6.027, $p = .003$. Data revealed that this PLC practice increased from the Focus group (2.9 ± 1.1) to the Highest Progress group (3.5 ± 0.7). Tukey's *post hoc* analysis indicated that the increase (0.58, 95% CI [0.07 to 1.09]) was statistically significant ($p = .021$).

Researchers with the AISR (2004) indicated that PLCs meet regularly for the purpose of improving instruction, student outcomes, and participants' knowledge. As the researchers noted, PLCs require educators to be open and honest with themselves and members of the group as they seek ways to improve their work. The current PLC study

supports the finding that providing feedback to peers helps teachers grow professionally and change the culture of their schools.

Research Question 2 asked if a significant relationship existed between teacher level of education and practice of PLC dimensions. A Pearson's Product Moment correlation analysis indicated a small statistically significant positive correlation between teachers' levels of education and two of the ten PLC dimensions studied.

Correlations matrices indicated small positive correlations between teacher education level and the PLC practices of observing peers, $r = .164$, providing feedback to peers related to instructional practices, $r = .165$, sharing results of instructional practices, $r = .037$, working together to assess policies that encourage student learning, $r = .037$, working together to produce instructional materials, $r = .094$, discussing one another's teaching methods, $r = .081$, and discussing substantive student-centered educational issues, $r = .108$.

Further examination of the levels of statistical significance (p-values) revealed a small statistically significant positive correlation between teachers' levels of education and observing peers, $r(178) = .164$, $p = .028$, as well as between teachers' levels of education and providing feedback to peers related to instructional practices, $r(178) = .165$, $p = .027$.

Strahan (2003) found that teachers and administrators in elementary schools identified priorities for improvement, used assessment data to target areas for enhancement in teaching practices, and began school-based professional development to improve classroom instruction. Over time, students became more successful, PLCs grew

stronger, and a culture developed to communicate high expectations to new teachers and new students.

Strahan (2003) further reported that PLC members depended on their colleagues for suggestions and support when they were unsure of how to meet students' needs. In turn, this set the stage for continued improvement, and a renewable source of energy for PLC participants ensued. Results of the current study suggest that forming mentoring relationships between educators with higher degrees and those with lower levels of post-graduate work improves teacher quality.

Research Question 3 sought to determine the relationship, if any, between teacher practice of PLC dimensions and student performance on Georgia's CRCT as measured by each selected school's designation as a Focus, Highest Progress, or Highest Performing elementary school. A Pearson's Product Moment correlation was utilized to answer this question, and a partial correlation analysis was used to test if training was a moderating variable. The correlation coefficient, indicating the degree to which the variables were linearly related, was squared (R^2) to determine the amount of variance contributed by each variable. These procedures revealed a small statistically significant correlation between the practice of PLC dimensions and student achievement on the CRCT in three of the ten PLC dimensions studied.

Correlations matrices indicated small positive correlations between student CRCT performance as indicated by school designation and collaboratively reviewing student work, $r = .186$, sharing results of instructional practices, $r = .068$, working together to assess policies related to student learning, $r = .053$, working with colleagues to judge the quality of student work, $r = .242$, working together to produce instructional materials, $r =$

.112, discussing teaching methods, $r = .085$, and discussing substantive student-centered educational issues, $r = .159$. Small negative correlations were identified between student performance and observing peers, $r = -.181$, providing feedback on instructional practices, $r = -.068$, and peer coaching, $r = -.017$.

An examination of the levels of statistical significance (p-values) revealed a small statistically significant positive correlation between student performance on the CRCT and collaboratively reviewing student work, $r(185) = .186$, $p = .011$, working with colleagues to judge the quality of student work, $r(186) = .242$, $p = .001$, and discussing substantive student-centered educational issues, $r(182) = .159$, $p = .031$. Further, a small statistically significant negative correlation was found between student performance and observing peers, $r(181) = -.181$, $p = .014$.

A partial correlation analysis controlling for training on the relationship between working with colleagues to judge the quality of student work and student achievement indicated that the first-order correlation was statistically significant, $r(164) = .205$, $p = .008$. Controlling for training on the relationship between discussing substantive student-centered educational issues and student achievement proved to be statistically significant, $r(160) = .168$, $p = .032$, and controlling for training on the relationship between observing peers and student achievement revealed a small statistically significant negative correlation, $r(165) = -.182$, $p = .018$.

Analysis of the coefficients of determination indicated the practice of observing peers accounted for 3% of the variance in student performance when controlling for teacher training in the PLC practices. Working with colleagues to judge the quality of

student work accounted for 4% of the variance, and discussing substantive student-centered educational issues accounted for 3% of the variance.

Vescio et al. (2008) examined how educators changed their teaching practices as a result of PLC participation. The researchers found that participants' practices became more student-centered over time. For example, some teachers varied their lesson pacing to meet the needs of learners while others used higher order thinking strategies. The researchers found data supporting fundamental shifts in the schools' professional cultures and the habits of mind teachers brought to their classrooms. Vescio et al. (2008) noted that the most successful PLCs shared four common characteristics: the teachers participated in open collaboration, the groups focused on student learning, the participants exercised some authority over their own learning and various aspects of school governance, and the members participated in continuous teacher learning to accomplish their goals.

Finally, Vescio et al. (2008) found that PLC participation resulted in improvement in student learning as measured by increases in test scores and other measures of student achievement. The researchers concluded that student achievement increased the most where PLCs were highly involved and teachers focused persistently on student learning and achievement data. These findings are closely related to the current study of PLCs.

It is interesting to note that although observing peers shared a small negative correlation with student achievement when controlling for teacher training in PLC dimensions, peer observation shared a small positive correlation with teacher level of education. Perhaps this is because, as Talbert (2010) found, it is often difficult for teachers to allow peer observers to come into their classroom and provide feedback, and

teachers are often uncomfortable discussing how their teaching affects student learning. However, studies have indicated (Learning Forward, 2011; Mindich & Lieberman, 2012; Passi, 2010; Vescio et al., 2008) that these are important practices to develop when schools seek to improve teaching quality and student outcomes.

Discussion

At first glance, many results of the statistical analyses within this study appear to be small, non-significant, and even unimportant. However, closer examination suggests that this may not be true at all. For example, the sample size for the study was problematic. According to Privitera (2012), increasing the sample size increases the value of test statistics in hypothesis testing and can lead a researcher to reject a null hypothesis when it might not have been rejected based on a smaller sample size. Therefore, the results of the current study may have been statistically different if a larger sample size had been selected (Field, 2009).

Secondly, careful inspection of the mean values for implementation of PLC dimensions among the three groups of schools (Focus, Highest Progress, and Highest Performing) indicates a relatively small range within each category of PLC practice. These score ranges are presented in Table 17.

Table 17

Mean Score Ranges for Implementation of PLC Dimensions

PLC Practice	*Range of Means*
Observe peers	2.4 to 3.6
Provide feedback to peers related to instructional practices	2.8 to 3.5
Collaboratively review student work to improve instructional practice	3.46 to 3.9
Peer coach	2.6 to 2.9
Share the results of instructional practices	3.6 to 3.8
Work together to assess policies that encourage student learning	3.6 to 3.8
Work with colleagues to judge the quality of student work	3.3 to 4.0
Work together to produce instructional materials	3.72 to 3.9
Discuss one another's teaching methods	3.3 to 3.7
Discuss substantive student-centered educational issues	3.3 to 3.7

It is worth noting that the vast majority of these mean score ranges fall at the *Somewhat Agree* to *Agree* level on the Likert scale. The results may be so similar in part because the five schools studied are located within the same RESA District. The consultants work closely with their member schools to offer many training opportunities, so it is likely that the teachers and administrators of the schools in the current study have participated in many of the same workshops offered by RESA staff. For this reason, implementation of the PLC dimensions could be fairly uniform throughout the schools within the RESA district.

Furthermore, a look beyond the numbers found within this study reveals agreement with many findings from the review of literature. For example, study results indicate that PLC members who reported observing peers, providing feedback related to instructional practices, working with colleagues to judge the quality of student work, and

collaboratively reviewing student work to improve instructional analysis were more likely to improve the quality of their teaching. These practices were found to improve learning outcomes for students, as well.

Many researchers provide data to support this observation of improved quality of teaching and learning through the implementation of PLC practices. AISR (2004), Borko (2004), Chaseling et al. (2014), Datnow (2011), Fairfield (2011), Jackl and Lougée (2012), Owen (2014), Pirtle and Tobia (2014), Prater (2010), Strahan (2003), and Wood (2007) used varied combinations of teacher and administrator surveys, interviews, observations, and assessment data to document the use of PLC principles to significantly impact classroom instructional practices and student achievement. In fact, Voelkel (2011) described a sense of collective efficacy among members of one PLC team that helped its school improve from lowest in the district to outperforming the district and state in ELA and mathematics achievement.

Similarly, teacher collaboration and increased student learning could lead to a school receiving a higher designation by a State Department of Education. For example, Georgia schools could move from being categorized as Focus schools to Highest Progress schools or from Highest Progress schools to Highest Performing schools. As in Voelkel's (2011) study highlighted in the preceding paragraph, Strahan (2003) reported on a school that significantly improved its performance level and state ranking after adopting PLC practices.

Results from the current study further indicate a positive correlation between teacher level of education and observing peers, as well as between the level of education and providing feedback to peers related to instructional practices (Vescio et al., 2008).

These results suggest that relationships between teachers with higher levels of education and those with lower levels of post-graduate education are important in improving teacher instructional quality and student learning outcomes (Learning Forward, 2011; Mindich & Lieberman, 2012; Woodland & Mazur, 2015).

Likewise, results of this study indicate positive correlations between student achievement on standardized assessments with teacher practice of collaboratively reviewing student work, working with colleagues to judge the quality of student work, and discussing substantive student-centered educational issues (Fairfield, 2011; Odden, 2011). These results suggest that teachers who meet regularly in PLCs to participate in activities such as examining student work, monitoring student progress, creating exemplars of student work, and improving inter-rater reliability could improve outcomes for students as measured through summative assessments (Owen, 2014; Stoll et al., 2006; Wood, 2007). Table 18 presents the conclusions drawn from this study.

Table 18

Conclusions Drawn from this Study

PLC Practices to Improve Teaching and Learning
Participate in continuous, job-embedded teacher training.
Conduct peer observations and provide feedback to improve classroom instruction.
Hold collegial conversations focused on student work, achievement data, and classroom practices.
Work with colleagues to ensure appropriate level of rigor and quality of student work.
Collaboratively review student work to improve instructional analysis and teaching quality.
Form mentoring relationships between teachers with varied levels of education.

Recommendations for Action

Based on a review of the literature and the present study of PLCs, the following actions are recommended for current practitioners in the field of education. Educators should devote time and resources to the development of PLCs within their schools. Teams of teachers should be encouraged to work collaboratively in an ongoing, job-embedded process of inquiry and action research to achieve better learning outcomes for their students (Fairfield, 2011; Learning Point Associates, 2009; Lieberman & Miller, 2011; Vescio et al., 2008). As schools begin this important work, PLC participants should develop a shared vision to articulate what is most important to the school community. This vision must become a guidepost for making all decisions about teaching and learning (Chaseling et al., 2014; Hord, 1997).

As administrators begin to transform their schools into learning communities, they must set aside resources and put supportive structures into place (Prater, 2010; Voelkel, 2011). Resources may include time for collaboration and peer observations, substitute teachers to cover classes, materials for professional learning, and stipends for work completed outside of the regular work day or school year (DuFour, 2014; GaDOE, 2013). Supportive structures may include common planning time for teachers built into the daily schedule, proximity of colleagues' classrooms, and a common meeting area where educators can share ideas, review student work, and analyze achievement data (DuFour et al., 2008; Passi, 2010).

Most importantly, schools must implement strategies to ensure that all students learn at high levels (Borko, 2004; Jackl & Lougée, 2012; Koenigsberger, 2015). To accomplish this goal, PLCs must support teachers as they shift from a focus on teaching

to a focus on student learning (Stoll et al., 2006; Wood, 2007). Throughout this process, teachers must monitor student progress and provide interventions or enrichment to meet the individual needs of all learners (Learning Forward, 2011; Mindich & Lieberman, 2012). Administrators must lead this charge, ensuring that all members of the learning community understand that they are collectively accountable for the achievement of all students (DuFour et al., 2008; Owen, 2014; Pirtle & Tobia, 2014).

Recommendations for Future Research

Based on a review of the literature and the present study of PLCs, the following recommendations might be considered for further research:

- Expand the work described in this study to include a larger sample size of teachers within more elementary schools. This research was limited to only one RESA district within the state of Georgia.
- Conduct a similar study at the preschool, middle school, high school, or post-secondary level. This study was limited to the elementary level.
- Replicate this study using different measures of student achievement. For example, a study could be conducted using the recently-implemented Georgia Milestones, Partnership for Assessment of Readiness for College and Careers (PAARC), or Smarter Balance assessment when one of these assessments is fully operational as an online evaluation instrument.
- Conduct a similar study using a qualitative research design. This method could provide an opportunity to closely investigate teacher and leader PLC training and practices.

- Expand the work outlined in this paper to include a deeper examination of online learning communities (OLCs). OLCs are becoming increasingly valuable for teacher collaboration, especially with the implementation of national learning standards across our country.

Conclusion

Results of this study indicate that educators who participate in collaborative PLC practices such as observing peers, providing feedback on instructional practices, analyzing student work, and discussing student-centered educational issues are more likely to improve the quality of classroom instruction. Furthermore, PLC participation and improved instructional practices are likely to result in increases in student learning outcomes. As stated by Learning Forward (2011), collective responsibility in PLCs increases teacher effectiveness through collaboration, communication, and relationships to support student learning. The resulting high expectations enable educators to bridge the knowing-doing gap and implement deep change for individual students, teachers, and school systems.

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APPENDIX A:

Institutional Review Board Protocol Exemption Report

Institutional Review Board (IRB)
for the Protection of Human Research Participants

PROTOCOL EXEMPTION REPORT

PROTOCOL NUMBER: IRB-03152-2015 **INVESTIGATOR: Rebecca Ratts**

PROJECT TITLE: The Influence of Professional Learning Communities in Elementary Schools as Measured by Student Achievement on the Georgia Criterion-Reference Competency Test

INSTITUTIONAL REVIEW BOARD DETERMINATION:

This research protocol is **exempt** from Institutional Review Board oversight under Exemption Category(ies) : 2&4. You may begin your study immediately. If the nature of the research project changes such that exemption criteria may no longer apply, please consult with the IRB Administrator (irb@valdosta.edu) before continuing your research.

ADDITIONAL COMMENTS/SUGGESTIONS:

Although not a requirement for exemption, the following suggestions are offered by the IRB Administrator to enhance the protection of participants and/or strengthen the research proposal:

NONE

☐ If this box is checked, please submit any documents you revise to the IRB Administrator at irb@valdosta.edu to ensure an updated record of your exemption.

Elizabeth W. Olphie 1/29/15

Elizabeth W. Olphie, IRB Administrator Date

Thank you for submitting an IRB application.

Please direct questions to irb@valdosta.edu or 229-259-5045.

APPENDIX B:

Sample Correspondence to Superintendent

Dear XXX,

I am a doctoral candidate at VSU, and I am writing my dissertation about teacher Professional Learning Communities. I have contacted XXX to ask permission to survey the teachers at XXX Elementary, but I also wanted to seek your approval of this project, as well. If you would like to read more about my research, please see the attached one-page summary.

Thank you in advance for your consideration of my request!

Becky Ratts

APPENDIX C:

Sample Correspondence to Principal

Dear XXX,

I contacted you a few weeks ago to ask about PLCs at XXX Elementary. I am almost ready to begin my teacher surveys, but first I would like to ask your permission to allow your faculty to participate.

Please review the attached one page description of my study. If you agree to let me come to meet with your teachers, please print and sign the attached letter of cooperation and email or fax it back to me at 229-549-8312 at your earliest convenience.

I will contact you to schedule a date for our meeting as soon as my dissertation proposal and Institutional Review Board application are approved by VSU. In the meantime, please feel free to contact me by phone at 229-549-7715 or email if you have any questions or concerns.

Thank you in advance for taking time to consider my request!

Becky Ratts

APPENDIX D:

Description of Study for Administrators

The Influence of Professional Learning Communities in Elementary Schools as Measured by Student Achievement on the Georgia Criterion-Referenced Competency Tests

The Professional Learning Community (PLC) process has been cited by researchers and professional organizations as having great potential to impact student achievement in a positive manner. As PLCs engage in a culture of continuous improvement, the participants use data to identify needs and goals for student and teacher learning, extend teachers' knowledge of content and pedagogy, select and implement evidence-based strategies for identified learning goals with on-site support, and use evidence to monitor, refine, and evaluate implementation of the strategies. Collective responsibility in PLCs brings together everyone within the school and the community at large to increase teacher effectiveness in every classroom through collaboration, communication, and relationships to support student learning (Learning Forward, 2011).

As the current era of high stakes accountability has left many teachers struggling to improve the quality of teaching and learning, PLCs have been recommended to foster collaboration and to make teacher practices public. Therefore, the purpose of this correlational study will be to examine elementary level teachers' descriptions of their PLCs to determine if the practice of these principles has an effect on student academic performance.

The study will use a written survey to discover how teachers in a Georgia RESA District's Focus, Highest Progress, and Highest Performing public elementary schools describe their schools as PLCs in relation to a focus on learning, shared vision, collaborative culture, and supportive structural conditions. The survey instrument will consist of 40 statements concerning these four dimensions of PLCs. Ten additional statements will ask participants to rate the level to which teachers have been trained in the various dimensions and the level to which these dimensions are actually being practiced in their schools.

Student achievement data for third, fourth, and fifth grade students in each of the selected schools will be collected from The Governor's Office of Student Achievement Report Card located on the gosa.georgia.gov Web site. Percentages of students scoring in the Meets and Exceeds ranges on the Reading, English Language Arts, and Mathematics sections of the CRCT for 2011, 2012, and 2013 will be examined to determine if student academic performance improves significantly with the practice of the identified PLC dimensions.

REFERENCE

Learning Forward. (2011). *Standards for professional learning.* Oxford, OH: Learning Forward.

APPENDIX E:

Sample Letter of Cooperation

Principal's Letter of Cooperation

Principal:
School:
Address:

Date:

Dear Rebecca Ratts,

Based on my review of your proposed research, I give permission for you to conduct the study titled *The Influence of Professional Learning Communities in Elementary Schools as Measured by Student Achievement on the Georgia Criterion-Referenced Competency Tests* within the XXX Elementary School. As part of this study, I authorize you to meet with our school faculty to collect anonymous survey data to be included in the completion of your dissertation at Valdosta State University. Individual teachers' participation will be voluntary and at their own discretion.

I understand that our organization's responsibilities include: scheduling a faculty meeting and providing a room for teachers to meet. We reserve the right to withdraw from the study at any time if our circumstances change.

The research will include the collection of survey data regarding teachers' perceptions of the existence of four dimensions of a Professional Learning Community within our school. This authorization covers the time period of January 30, 2015 to June 30, 2015.

I confirm that I am authorized to approve research in this setting.

I understand that the data collected will remain entirely confidential and may not be provided to anyone outside of the research team without permission from the Valdosta State University Institutional Review Board.

Sincerely,

_____

Principal's Signature

APPENDIX F:

Consent Statement for Anonymous Survey Research

Consent Statement for Anonymous Survey Research

You are being asked to participate in a survey research project titled *"The Influence of Professional Learning Communities in Elementary Schools as Measured by Student Achievement on the Georgia Criterion-Referenced Competency Tests,"* which is being conducted by Becky Ratts, a student at Valdosta State University. This survey is anonymous. No one, including the researcher, will be able to associate your responses with your identity. Your participation is voluntary. You may choose not to take the survey, to stop responding at any time, or to skip any questions that you do not want to answer. You must be at least 18 years of age to participate in this study. Your completion of the survey serves as your voluntary agreement to participate in this research project and your certification that you are 18 or older.

Questions regarding the purpose or procedures of the research should be directed to Becky Ratts at (229) 549-6422 or bratts@cook.k12.ga.us. This study has been exempted from Institutional Review Board (IRB) review in accordance with Federal regulations. The IRB, a university committee established by Federal law, is responsible for protecting the rights and welfare of research participants. If you have concerns or questions about your rights as a research participant, you may contact the IRB Administrator at 229-259-5045 or irb@valdosta.edu.

APPENDIX G:

Permission to Conduct Similar Study

September 12, 2012

Dr. Passi,

I would like to congratulate you on winning the 2011 NASSP Dr. Ted Sizer High School Dissertation Award for your investigation of professional learning communities! I am a doctoral student at Valdosta State University in Valdosta, Georgia, and I found your dissertation a few months ago while working on an annotated bibliography for one of my classes. I have now completed my course work, and I am beginning my work on my dissertation. I am writing to seek your permission to replicate your study.

I am interested in investigating the influence of professional learning communities in elementary schools, as you suggested in your recommendations for future research. I have discussed this topic with my committee chair, Dr. Leon Pate, and he encouraged me to contact you to gain your approval before I begin my formal work. If you approve of my request, I would welcome any information or advice you would be willing to share.

Thank you in advance for considering my request. I look forward to hearing from you soon!

Sincerely,
Becky Ratts
Cook County Schools
Professional Learning/Gifted Coordinator
K-5 Curriculum/Pre-K Director

From: "Dr. Gaurav Passi" <gpassi@lbeach.org>
To: "Becky Ratts" <bratts@cook.k12.ga.us>
CC: <jlpate@valdosta.edu>, <rjmanley@optonline.net>
Date: 9/12/2012 9:54 PM
Subject: Re: Dissertation: Professional Learning Communities

Ms. Ratts,

I'm thrilled that you'll be applying my study to elementary schools. You can certainly replicate it and I'd be happy to help in any way l can. One piece of [advice] I can offer, is to try and hand out the surveys at faculty meetings. My return rate was phenomenal and I was able to get the data into SPSS very quickly.

Best of luck. Please email if there is anything else that you need. I'd love to see the finished product.

Warmly,

Gaurav Passi, Ed.D.
Principal
Long Beach High School
(516) 897-2013

APPENDIX H:

Professional Learning Communities Assessment Survey

PROFESSIONAL LEARNING COMMUNITIES ASSESSMENT

Demographic Questions

1. Gender: □Male □Female
2. Level of Education: □BA □MA □Ed.S □Ed.D □Ph.D
3. Years of teaching experience in any school: _____
4. Years of teaching experience in current school: _____

Directions: This questionnaire examines four dimensions of a professional learning community (PLC) and their related attributes. There are no "right or wrong" responses.

This questionnaire contains a number of statements about practices which occur in some schools. Please read each statement and then use the scale below to select the scale point that best reflects your personal degree of agreement with the statement. Be certain to select only one response for each statement.

Scale:				
1	2	3	4	5
Strongly Disagree (SD)	Disagree (D)	Somewhat Agree (SW)	Agree (A)	Strongly Agree (SA)

		SD	D	SW	A	SA
1.	Our school has a system of interventions in place to guarantee that each student will receive additional time and support for learning if he/she experiences difficulty.	1	2	3	4	5
2.	The staff shares a vision of shared responsibility for student learning.	1	2	3	4	5
3.	Teachers in our school learn together with their colleagues.	1	2	3	4	5
4.	Time is provided to facilitate collaborative work.	1	2	3	4	5
5.	Students in our school are required to devote extra time and receive additional support if they experience difficulty learning.	1	2	3	4	5
6.	A collaborative process exists for a shared sense of values among staff.	1	2	3	4	5
7.	Collegial relationships exist among staff.	1	2	3	4	5
8.	The school schedule promotes collective learning.	1	2	3	4	5
9.	Staff members in our school have developed strategies to enrich the learning of students who have demonstrated mastery in the subject matter.	1	2	3	4	5
10.	Shared values support norms of teaching and learning.	1	2	3	4	5
11.	Teachers in my school regularly discuss teaching methods.	1	2	3	4	5
12.	Fiscal resources are available for professional development.	1	2	3	4	5
13.	Learning outcomes have been defined for each unit of study in my department.	1	2	3	4	5
14.	The staff shares a vision for school improvement that has an undeviating focus on student learning.	1	2	3	4	5

		SD	D	SW	A	SA
15.	Teachers in my school observe each other teach.	1	2	3	4	5
16.	Instructional materials are available to staff.	1	2	3	4	5
17.	Teachers in our school take a collective responsibility for student learning.	1	2	3	4	5
18.	Decisions are made in alignment with the school's vision.	1	2	3	4	5
19.	Teachers in my school routinely analyze data related to student achievement.	1	2	3	4	5
20.	The school provides expertise and support for continuous learning.	1	2	3	4	5
21.	Teachers in our school set learning targets for individual students.	1	2	3	4	5
22.	Stakeholders share a vision for the goals of student learning.	1	2	3	4	5
23.	Teachers have dedicated time for collaborative lesson planning.	1	2	3	4	5
24.	The school facility is clean, attractive, and inviting.	1	2	3	4	5
25.	The curriculum in my department has been mapped to promote consistency amongst teachers.	1	2	3	4	5
26.	Policies are aligned to the school's vision.	1	2	3	4	5
27.	Teachers informally share ideas to improve student learning.	1	2	3	4	5
28.	The school provides personnel space to collaborate with colleagues.	1	2	3	4	5
29.	Student learning is clearly the focus of all departmental meetings.	1	2	3	4	5
30.	A shared vision exists for creating high expectations for student achievement.	1	2	3	4	5
31.	Caring relationships exist among teachers and students.	1	2	3	4	5
32.	Communication systems promote a flow of information.	1	2	3	4	5
33.	Specific student achievement goals have been established by our department.	1	2	3	4	5
34.	Professional development focuses on a shared vision of learning.	1	2	3	4	5
35.	Teachers develop common assessments of students.	1	2	3	4	5
36.	A variety of procedures are used to encourage teacher communication.	1	2	3	4	5
37.	Our department routinely analyzes student achievement data.	1	2	3	4	5
38.	School staff members learn together.	1	2	3	4	5
39.	Teachers engage teachers in dialogue specifically linked to gains in student achievement.	1	2	3	4	5
40.	Teachers engage in adjusting instructional strategies and/or curriculum based on student data analysis.	1	2	3	4	5

Training We have been trained to…						Actual Practice We actually…				
SD	**D**	**SW**	**A**	**SA**		**SD**	**D**	**SW**	**A**	**SA**
1	2	3	4	5	41. Observe peers.	1	2	3	4	5
1	2	3	4	5	42. Provide feedback to peers related to instructional practices.	1	2	3	4	5
1	2	3	4	5	43. Collaboratively review student work to improve instructional practice.	1	2	3	4	5
	2	3	4	5	44. Peer coach.	1	2	3	4	5
1	2	3	4	5	45. Share the results of our instructional practices.	1	2	3	4	5
1	2	3	4	5	46. Work together to assess policies that encourage student learning.	1	2	3	4	5
1	2	3	4	5	47. Work with colleagues to judge the quality of student work.	1	2	3	4	5
1	2	3	4	5	48. Work together to produce instructional materials.	1	2	3	4	5
1	2	3	4	5	49. Discuss one another's teaching methods.	1	2	3	4	5
1	2	3	4	5	50. Discuss substantive student centered educational issues.	1	2	3	4	5